ATTO Technology, Inc.

iPBridge
Installation and Operation Manual
iPBridge 2700C/R/D
iSCSI to FibreChannel Bridge

ATTO Technology, Inc.
155 CrossPoint Parkway
Amherst, New York 14068 USA

www.attotech.com

Tel (716) 691-1999
Fax (716) 691-9353

Sales support: sls@attotech.com
Technical support: Monday -- Friday, 8am-6pm EST
techsupp@attotech.com(716) 691-1999 ext. 242

© 2009 ATTO Technology, Inc. All rights reserved. All brand or product names are trademarks of their respective holders. No part of this manual may be reproduced in any form or by any means without the express written permission of ATTO Technology, Inc.

10/2009 PRMA 0358-000

Contents

1 ATTO iPBridge Provides Storage Options 1

Embedded software features
Connectivity, infrastructure solutions

1.1 ATTO iPBridge 2700R/D Physical Attributes 3

Dimensions
Environment
Power
Ethernet data ports
Fibre Channel data ports
Management ports
LED indicators

1.2 ATTO iPBridge 2700C Physical Attributes 5

Dimensions
Environment
Power
Ethernet interface
Fibre Channel interface
Management ports
Reset/restore factory default switch
LED indicators

2 Installation 7

Unpacking the packing box; verifying contents
Placing the iPBridge into your system
Installing Windows drivers
Discovering the IP address
Installing MS iSCSI Initiator for Windows
Installing iSCSI Initiator for OS X
Setting up Internet Explorer
Beginning initial configuration

3 Configure the iPBridge 9

Preliminary steps
ExpressWizard

3.1 Target Management 11

Target names
Default target node
Automatically configure a single target
Map devices manually
Multiple target nodes
Automatically configure multiple targets
Manually configure multiple target nodes

3.2 iSCSI Configuration 14

Ethernet
iSCSI
CHAP commands

3.3 Modify System Values 15
Preliminary steps
Modify passwords
Set up a VLAN: Virtual Local Area Network
Enhance performance
iSCSI performance configuration tool (Windows only)

4 Remote System Monitoring 17
SNMP
Email notification

5 Updating Firmware 19
Using ATTO ExpressNAV
Using FTP

6 Troubleshooting 20
Inside out method
Check basic diagnostic tools
Check the host event log
Check the event and trace logs
Visually inspect LEDs
Check for problems on attached devices
Check host versions
Check iPBridge product versions and update firmware
Check components
Check Fibre Channel devices
Check the iPBridge FC ports
Check the serial port
Check iPBridge internal configuration
Check iPBridge Ethernet ports
Check the LAN/WAN
Check the iSCSI Host Adapter or NIC
Check the iSCSI OS driver
Check the Operating System
Performance Issues
Check Fibre Channel devices
Check the iPBridge Ethernet ports
Check the LAN/WAN
Check the Ethernet host adapter or NIC
Check applications
Check the host system
Check the Operating System
Optimize ATTO ExpressNAV in Internet Explorer
Use the ATTO iSCSI performance configuration tool for Windows
Reset/restore factory default

7 Interface Options 27
Using ExpressNAV
Opening an ExpressNAV session
Optimizing ExpressNAV in Internet Explorer
Using the serial port
Using Telnet

Appendix A CLI provides an ASCII-based interface i

CLI error messages
CLI summary
Alphabetical CLI command explanations

Appendix B Safety standards and compliances xiv

Appendix C Warranty information xvi

Manufacturer limited warranty

1 ATTO iPBridge Provides Storage Options

The ATTO iPBridge™ 2700C/R/D iSCSI to Fibre Channel bridge offers an affordable opportunity to transform Fibre Channel storage into network-enabled addressable devices, creating scalable solutions for an iSCSI SAN.

The iPB2700 is a cost effective, high performance bridge using four Gigabit iSCSI ports and two independent 4-Gb Fibre Channel buses.

The iPBridge comes in two form factors:

- 4U cPCI embeddable circuit board or blade, designated as the iPBridge 2700C
- a rack mount / desktop version (13”d x 19”w x 1U) designated as the iPBridge 2700R/D

Because the iPBridge 2700C/R/D provides a compact embeddable, rack or desktop solution, you can install the iPBridge in a wide range of system configurations. Uniquely designed to support the high throughput needs for applications that require streaming data transfers (data backup), the iPBridge optimizes performance by using ATTO Technology intelligent Bridging Architecture.

The iSCSI protocol allows storage devices such as hard drives, tape drives and libraries and CD jukeboxes to attach easily to Internet Protocol networks such as Gigabit Ethernet. The ATTO iPBridge supports the high throughput needs of streaming data transfers, optimizing performance and management using ATTO Technology intelligent Bridging Architecture™.

Embedded software features

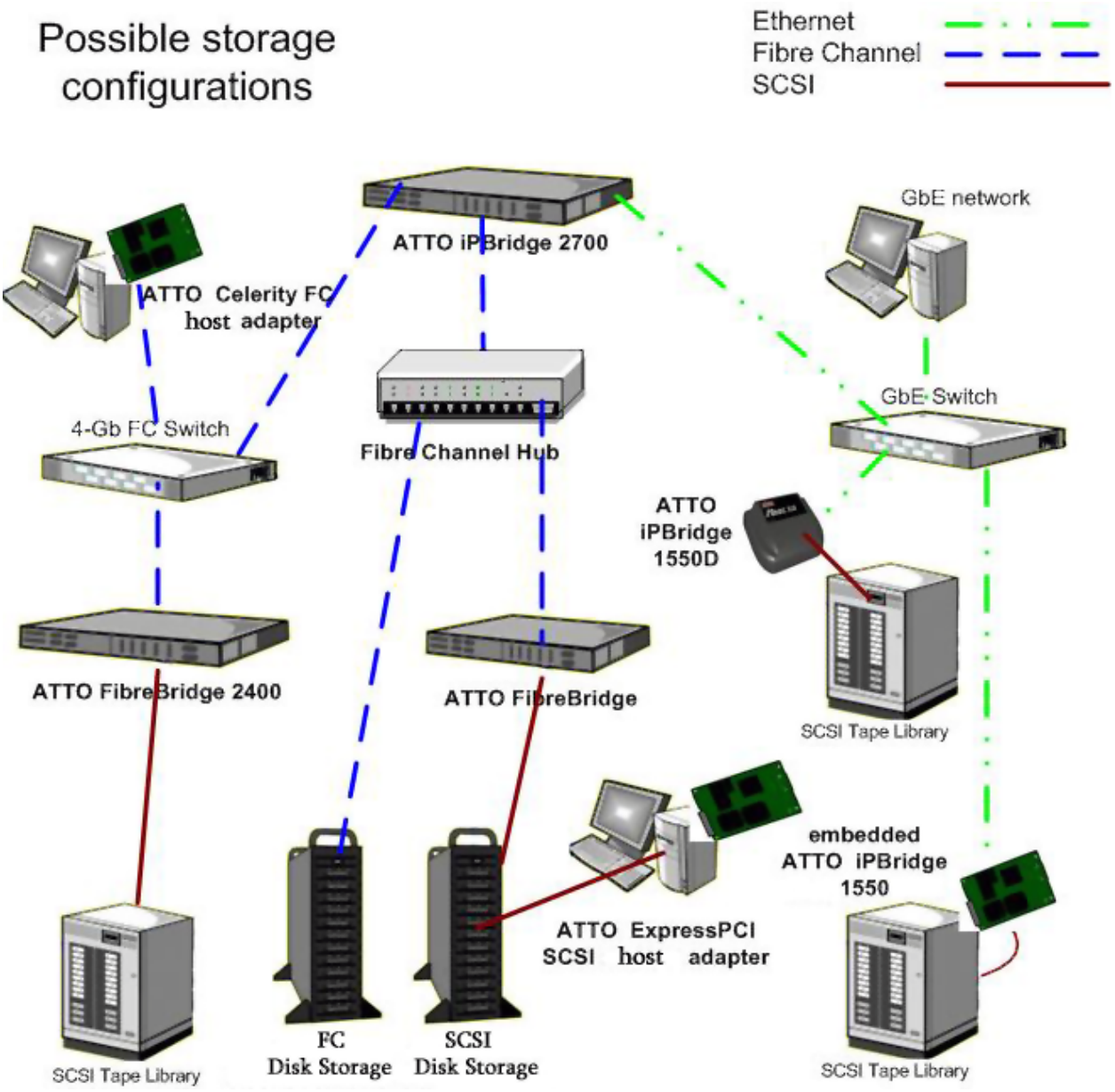
- ATTO ExpressWizard: a quick way to initially set up the iPBridge and storage for specific applications.
- SpeedWrite™: a performance-enhancing capability that significantly boosts Write performance by efficiently managing Write commands between host and a tape device.
- Security thorough Virtual LANs, Access Control Lists (ACLs) and multiple levels of password protection.
- Advanced Diagnostics: includes software event-logging capability time and date stamped by the real time clock. You can also determine numerous status and current configuration parameters.
- ATTO ExpressNAV™: a web-based management application that allows all of the configurable settings for the iPBridge to be defined, viewed and edited.

Connectivity, infrastructure solutions

The topology of a heterogeneous Storage Area Network shown below demonstrates the critical role ATTO products play in the design and implementation of a SAN. Whether your application needs are data-intensive or band-width intensive, you need to store and manage that data and then deliver it to end-users efficiently. ATTO products have been engineered with the highest performance and lowest cost available today.

- 4 independent 100/1000 GbE RJ45 Ethernet/iSCSI ports to 2 optical SFP independent 4-Gb Fibre Channel ports
- Near wire speed (99.35%) per GbE port
- Auto negotiates to 4/2/1 Gb Fibre Channel
- Full support for direct connect to F-port fabric switches, FC-AL, PLDA, public loop login and iSCSI protocol 1.0
- *i*ntelligent Bridging Architecture, the engine within ATTO iPBridge™ products, uses ATTO Data Routing for optimized performance
- Fabric topology and ATTO Virtual Device Manager to optimize performance

Possible storage configurations



1.1 ATTO iPBridge 2700R/D Physical Attributes

The ATTO iPBridge 2700R/D is a 1-Gigabit Ethernet to Fibre Channel 1U full-rack bridge for high performance, cost effective solutions in enterprise environments.

Dimensions

Width: 17 inches

Length: 8.94 inches

Height: 1.7 inches (1U)

Weight: 8 pounds

Environment

Operating temperature: 5-40 °C external

Ambient air should not exceed 40 °C

Cooling: air enters through the slots in the rear panel and exits through the blower on the far end of the rear panel.

Humidity: 10-90% non-condensing

Power

Power draw: 100-260 VAC@1.7-.7 amps. ATTO Technology, Inc. does not offer specific international power cords. The power inlet on the unit is a IEC320-C14. When selecting a cord, be sure it meets all national safety compliance requirements.

Battery-backed event log SRAM & Real-Time-Clock: A rechargeable Lithium ion battery cell will hold the memory in a 512KB SRAM for up to 30 days.

WARNING

Risk of explosion if the battery is removed and/or replaced by an incorrect type. Dispose of used batteries in accordance with your local environmental regulations.

If the iPBridge has been disconnected from power, recharging begins automatically when power is restored to the system. The battery is fully charged after 24 hours of continuous power application.

Ethernet/iSCSI data ports

The four independent 100/1000 Ethernet RJ-45 data ports are labelled Ethernet ports 1, 2, 3 and 4. The data ports support IP v.4 in compliance with IEEE 802.3 GbE. Each may also be used for iPBridge management.

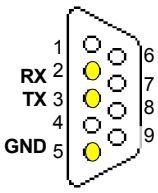
GbE cables must be at least CAT-5E certified for 1000 Mb/sec. use.

Fibre Channel data ports

The two independent optical SFP 4-Gb Fibre Channel ports auto-negotiate to 1-, 2- or 4-Gb devices.

Management ports

A 100 Mb/sec. Ethernet standard RJ-45 management port and an RS-232 serial port provide support for remote monitoring and management. The serial port is set at the factory at 115,200 bps.



LED indicators

From the connector side: (see Exhibit 1.1-2**):**

Ready/Fault LED lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.

Ethernet management port: a lighted green LED shows a valid link; off indicates that no link is present. A separate blinking yellow LED indicates activity.

Ethernet ports: a green light on the bicolor LED indicates 100 Mb/sec. Ethernet speed while a lighted yellow LED shows 1000 Mb/sec. A separate solidly lit green LED indicates an active link, blinking indicates activity and off shows no link is present.

Fibre Channel ports: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

From the front of the iPBridge (see Exhibit 1.1-1):

Ready/Fault LED is lighted green indicates ready, lighted yellow shows a faulted condition, and off indicates not ready.

Power LED lights green to show the power is on.

Ethernet ports: a lighted yellow LED indicates 1000 Mb/sec.; if it is off, it means 100 Mb/sec. speed. A separate green LED indicates activity if it is lit.

Fibre Channel ports: a bicolor LED indicates FC speed. If it is off, speed is 1-Gb; if it is green, 2-Gb, and yellow indicates 4-Gb FC. A separate green LED indicates activity if it is lit, no activity if it is off.

Exhibit 1.1-1 iPBridge 2700R/D front label.

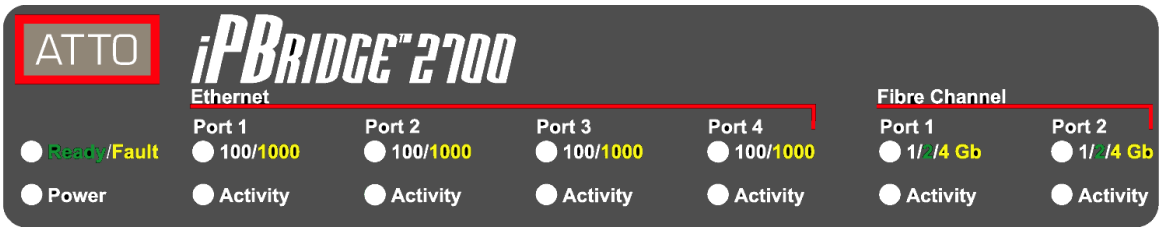
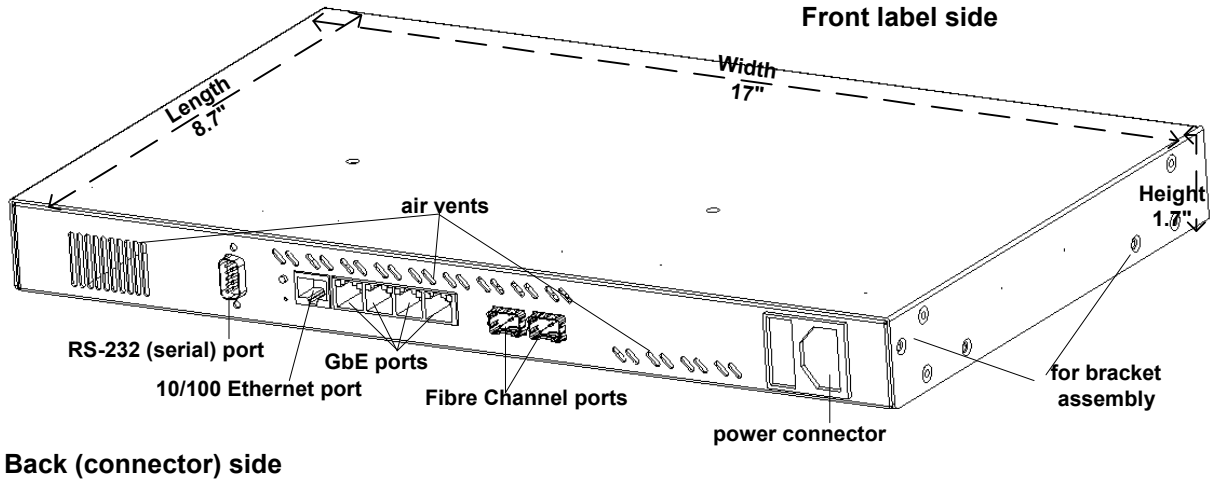


Exhibit 1.1-2 Overview of iPBridge 2700R/D from the back (connector) side.



1.2 ATTO iPBridge 2700C Physical Attributes

The ATTO iPBridge 2700C is a 1-Gigabit Ethernet to Fibre Channel embeddable cPCI bridge for high performance, cost effective solutions in enterprise environments.

Dimensions

Width: 6.193 inches

Length: 6.299 inches

Height of tallest component: .545 inches

Environment

Operating Temperature: 5-40 °C external

Ambient air: should not exceed 40 °C

User-configurable thermal sensor for automatic shutdown. Default is 70 °C

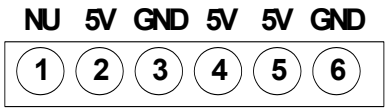
Humidity: 10-90% non-condensing

Recommended airflow: 166.25 LFM

Power

The iP2700C board may be powered from the cPCI backplane connector or a 6-pin connector.

6-pin connection pinouts



Input voltage: 5.0V

Power draw: 30 Watts

Battery-backed event log SRAM & Real-Time-Clock: A rechargeable Lithium ion battery cell will hold the memory in a 512KB SRAM for up to 30 days.

WARNING

Risk of explosion if the battery is removed and/or replaced by an incorrect type. Dispose of used batteries in accordance with your local environmental regulations.

If the iPBridge becomes disconnected from power, recharging begins automatically when power is restored to the system. The battery is fully charged after 24 hours of continuous power application.

Ethernet interface

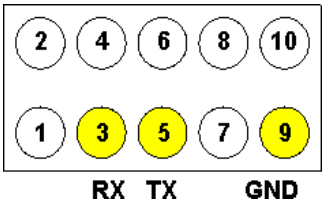
The four independent 100/1000 Ethernet/iSCSI RJ-45 data ports are labelled Ethernet ports 1, 2, 3 and 4. The data ports support IP v.4 in compliance with IEEE 802.3 GbE. Each may be used for iPBridge management. GbE cables must be at least CAT-5E certified.

Fibre Channel interface

The two independent optical SFP 4-Gb Fibre Channel ports auto-negotiate to 1-, 2- or 4-Gigabit devices.

Management ports

A 100 Mb/sec. Ethernet standard RJ-45 management port and a serial 10-pin header provide support for remote monitoring and management. The serial port is set at the factory at 115,200 bps.



Reset/restore factory default switch

To reset the iPBridge, briefly insert a tool in the hole in the back panel for less than three seconds. See Exhibit 1.2-1.

To restore factory defaults, insert the tool in the hole in the back panel for more than four seconds until the green Ready LED blinks.

LED indicators

On-board LED indicators show through the faceplate and follow left to right. See Exhibit 1.2-1.

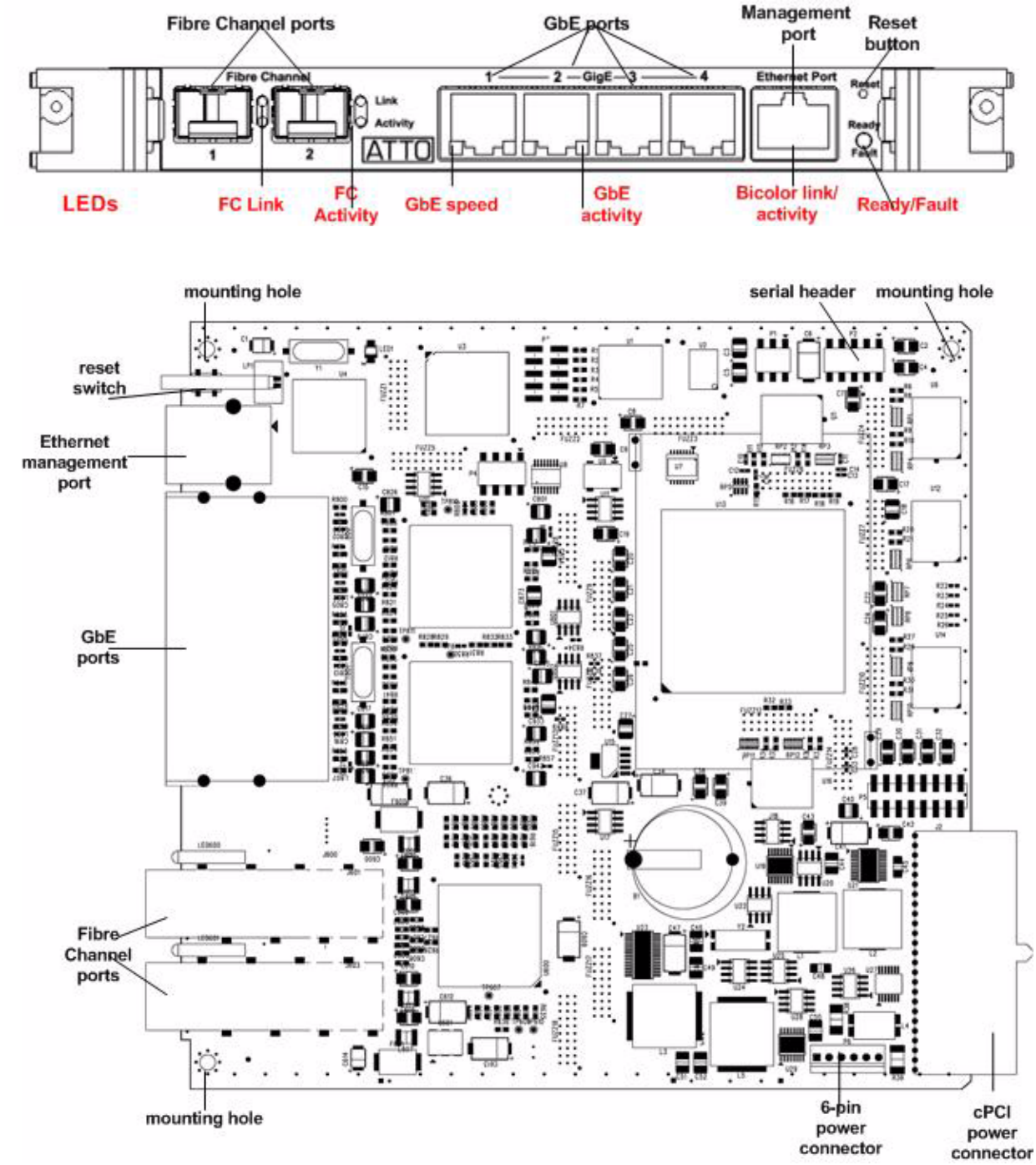
Fibre Channel ports: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

Gigabit Ethernet ports: a green light on the bicolor LED indicates 100 Mb/sec. Ethernet speed while a lighted yellow LED shows 1000 Mb/sec. A separate solidly lit green LED indicates an active link, blinking indicates activity and off shows no link is present.

Ethernet management port: a lighted green LED shows a valid link; off indicates that no link is present. A separate blinking yellow LED indicates activity.

Ready/Fault: lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.

Exhibit 1.2-1 iPBridge 2700C faceplate and board configuration



2 Installation

If you have not already completed the instructions on the Quick Start packed with your iPBridge, use the following instructions to install the iPBridge.

Unpacking the packing box; verifying contents

- The iPBridge
  Note the serial number of your iPBridge, located on the bottom of the unit, for later use:
  _____
- Serial cable
- Power cord
- “L” brackets and screws
- CD which includes the Installation and Operation Manual, the firmware, ATTO QuickNAV and ATTO drivers

Placing the iPBridge into your system

1 Place the iPBridge on a stable flat surface or install it into a standard rack.

If installing into a rack, see Exhibit 2.0-1.

a. Attach brackets so that the front side with the LEDs face front and the connector side is at the back.

b. Install the iPBridge horizontally within the rack so it does not reduce the air flow within the rack.

2 Connect the host computer to Fibre Channel devices.

3 Power up the Fibre Channel devices.

4 Connect the iPBridge Ethernet port on the host computer to your network using at least Cat5e cable.

5 Connect the AC power cord from the iPBridge to the proper AC source outlet.

CAUTION

The power source must be connected to a protective earth ground and comply with local electrical codes. Improper grounding may result in an electrical shock or damage to the unit.

If installing into a rack note that the power requirements plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

6 Turn on the power switch on the iPBridge.

7 Wait up to two minutes for the iPBridge Ready LED to light indicating the bridge has completed its power-on self test sequence.

8 Windows® users continue to Installing Windows drivers; Mac® users continue to Discovering the IP address

Installing Windows drivers

1 Windows automatically detects the iPBridge and asks for the driver in the **Add Hardware** wizard. Select **Install from a list or specific location**

2 Click **Next**

3 Choose **Don’t Search**

4 Click **Next**

5 Choose **Have disk**

6 Specify the driver as found in the **PC** folder in the setup CD. The files are in a folder based on your operating system. Use the files directly from the CD or copy them onto a floppy or to a local directory on your hard drive.

7 Follow the remaining instructions to complete the installation procedure.

8 After the driver is installed, the iPBridge is listed in the **System Devices** folder.

Discovering the IP address

1 From the CD supplied with your iPBridge, run the QuickNav Utility **QuickNAV-windows.exe** for Windows or **QuickNAV-Mac** for OS X.

2 Locate the iPBridge with the serial number recorded earlier.

3 Highlight the serial number.

4 Click **Next**.

If a DHCP server is available on your network, an address is assigned automatically by the server. Note the assigned address:

_____

If you do not have a DHCP server, get an IP address and subnet mask from your network administrator, type it into the area provided, and select **Next**. Note the IP address and subnet mask here._____

5 Click on **Launch Browser**

Windows users continue to Installing MS iSCSI Initiator for Windows; Mac users continue to Installing iSCSI Initiator for OS X.

If you use Internet Explorer, use Setting up Internet Explorer if needed.

Installing MS iSCSI Initiator for Windows

1 Download the latest version of Microsoft® iSCSI Software Initiator from **www.microsoft.com/downloads.** Searching on **iSCSI Initiator** helps to locate it.
2 Launch the Initiator installation program and follow the instructions.
3 Find the Microsoft iSCSI Initiator icon on your desktop and launch the program.
4 Click on the **Discovery** tab.
5 Click on the **Add** button under the target portal heading.
6 Type in the iPBridge IP address recorded in Discovering the IP address on page 7.
7 Click on **OK**
8 Click the **Targets** tab.
9 Click on **Log on** button.
10 Select **Automatically restore**
11 Click **OK** to complete logon.
12 If the **Found New Hardware Wizard** appears, follow the instructions and install the driver from the CD that came with your iPBridge.
13 Click **OK** to close the iSCSI Initiator utility.

You should now have storage you can manage through Windows Disk Management.
Continue to Beginning initial configuration.

Installing iSCSI Initiator for OS X

Contact your ATTO sales representative or go to **www.attotech.com** to purchase the ATTO Technology Xtend SAN, iSCSI Initiator for OS X.

Setting up Internet Explorer

1 Open your browser.
2 Select **Internet Options**.
3 In the **Internet Options** screen, select the **Security** tab.
4 Click on the **Trusted Sites** icon.
5 Click on the **Sites** button.
6 In the text box **Add this Web site to the zone**, add the IP address of the iPBridge. You may use wild cards.
7 Click on **Add.**
8 Uncheck the **Require server verification** check box.
9 Click **OK.**
10 At the bottom of the **Internet Options** box, click on **OK** and close the box.

Beginning initial configuration

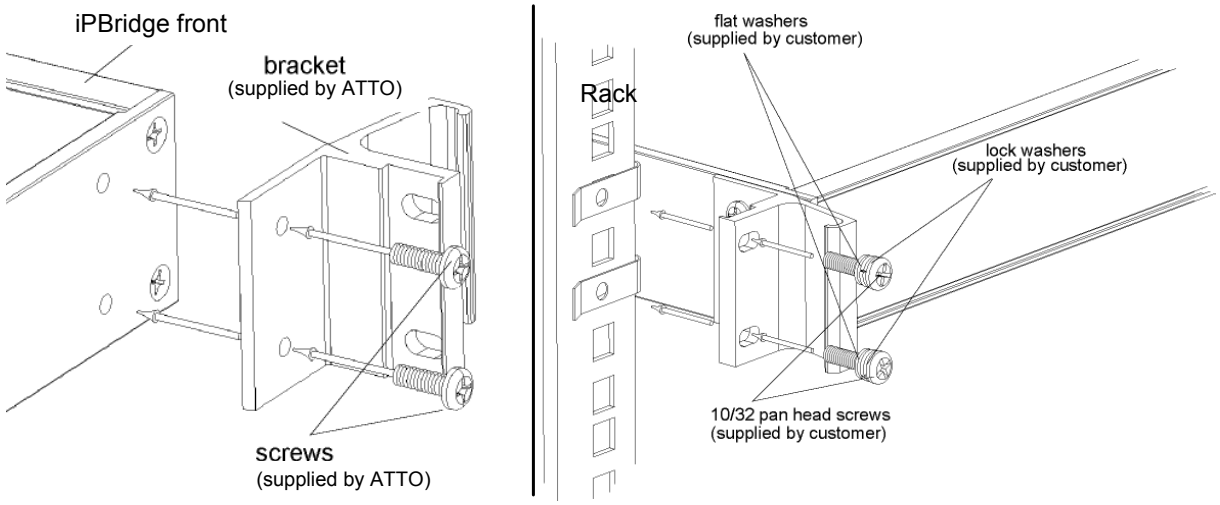
1 Return to the ExpressNAV interface welcome screen. Click on **Enter Here.**
2 Type in the user name and password.

Note

*The default values are user name **root** and password **Password**. The user name is case insensitive and the password is case sensitive.It is best practice to change the default user name and password. Refer to Modify passwords on page 15.*

3 Click on **OK**. The **Status** page appears. Continue to Configure the iPBridge on page 9.

Exhibit 2.0-1 Install the iPBridge into a rack using the brackets provided.



3 Configure the iPBridge

To configure the ATTO iPBridge, use ATTO ExpressNAV. Default values are appropriate for most configurations, but may be modified.The ExpressWizard provides one-button setup for many applications.

Default values are appropriate for most applications. If you wish to change these values, use ATTO ExpressNAV, a browser-based graphical interface. Other methods are also available. Refer to Interface Options on page 27.

If you do not use the ExpressWizard, continue to

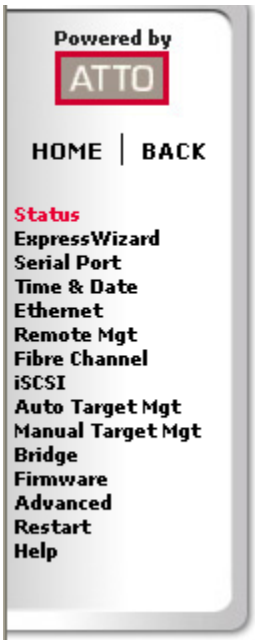
- Mapping and addressing, also known as Target Management on page 11
- iSCSI Configuration on page 14
- Modify System Values on page 15

Preliminary steps

1 If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.

2 The **Status** page appears.

You may view the default settings by clicking on each element in the left hand menu, then continue in one of three ways:



- Review the settings, keeping the automatic settings created when you powered up your iPBridge and do nothing now.
- Use the **ExpressWizard**, accessed from the side menu, to initially set up your iPBridge and its attached storage for specific applications automatically.
- Use the individual pages listed on the side menu to make changes or use other features as needed.

ExpressWizard

Most applications may be set up automatically using the ExpressWizard from the ExpressNAV interface. The ExpressWizard simplifies initial configuration of the iPBridge.

1 Follow the Preliminary steps.

2 From the side menu select **ExpressWizard**.

3 Select your storage type

- **Digital video disk storage**: optimized for digital video (sequential access) configurations
- **Digital audio disk storage**: optimized for audio applications (sequential access)
- **IT/database disk storage** optimized for general IT and database applications (random access)
- **Tape storage**
- **Optical storage**

4 Click **Next.**

5 In the **Devices Detected** page, click on **Rescan** to ensure all the devices you wish in your storage configuration are present. The ExpressWizard uses all attached storage for the configuration.

6 When all devices are listed, click **Next**.

7 Data port IP address, subnet mask and gateway information is listed. Change any elements as needed.

8 Click **Next**.

9 Select the answer to the question **Does your network support Jumbo Frames?**

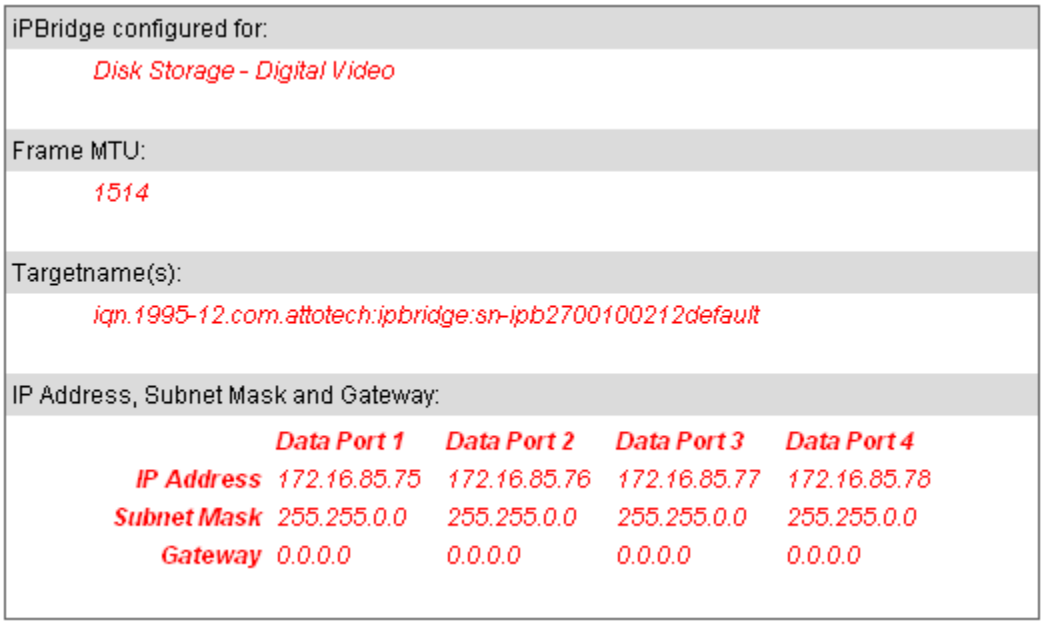
10 Click **Next.**

11 Set your administrator password.

12 Click **Next.**

13 The configuration for the iPBridge based on your input in the previous screens appears. If the information is correct, click **Commit.**

14 The ExpressWizard configures your iPBridge and storage. You may select items on the left side menu to view the current configuration or to change the configuration.


iPBridge configured for:
Disk Storage - Digital Video
Frame MTU:
1514
Targetname(s):
iqn.1995-12.com.attotech:ipbridge:sn-ipb2700100212default
IP Address, Subnet Mask and Gateway:
Data Port 1 Data Port 2 Data Port 3 Data Port 4
IP Address 172.16.85.75 172.16.85.76 172.16.85.77 172.16.85.78
Subnet Mask 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0
Gateway 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0

3.1 Target Management

Storage devices are mapped using the designations for the iSCSI LUN. The easiest way to map devices is to use the Automatic Target Management feature in the ATTO ExpressNAV interface.

CAUTION

Changing the device map can affect the host's view of devices and your application configuration

To map Fibre Channel devices, you must connect the devices to one of the iPBridge Fibre Channel ports. To access mapped Fibre Channel devices over Ethernet, you must have a host computer connected to one of the iPBridge iSCSI data ports.

The default is set up as a single target node in which a host or initiator views the iPBridge as a single iSCSI node with all available devices shown as LUNs on a single iSCSI target.

If you decide to change the automatic mapping set up when you powered up the iPBridge, you have two options to map devices after you disable automatic mapping:

- You may map devices manually to the single default node.
- You may map each device to its own target to break the single iSCSI target node into multiple nodes. Multiple target nodes allow greater flexibility to grant or deny access between initiators and devices.

If you divide the default single target node into multiple target nodes, you must set up access to each node separately.

See Exhibit 3.1-1 on page 13 to see the difference between single target node and multiple target nodes.

Target names

Each iSCSI target node accessed through the Ethernet port on an iPBridge is identified by a unique world-wide iSCSI-qualified name. This format references the iPBridge serial number and target node name:

```
iqn.1995-12.com.attotech:ipbridge:
serialnumber <targetname>
```

Default target node

The default target is set as a single target with Access Control (ACL) disabled and CHAP authentication disabled. The default target node cannot be deleted. The iPBridge maps devices automatically although you can map devices yourself.

Automatically configure a single target

1. If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.
2. The **Status** page appears. From the ExpressNAV menu, select **Auto Target Mgt**.
3. Click on the **Map all devices to default target** button.
4. When the action is complete, the **iSCSI Target Management** page appears. Make any adjustments to the mapping or begin a discovery session.

   If you are prompted to restart the iPBridge, go to the **Firmware Restart** page and restart the iPBridge.

Map devices manually

1. If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.
2. The **Status** page appears. Select the **Manual Target Mgt** menu item on the left side of the screen.
3. Click on the **Device Maps** link of the default target.
4. Select the devices from the box on the right hand side of the screen and drag to the appropriate LUN on the left.
5. Click **Submit**.

   If you are prompted to restart the iPBridge, go to the **Firmware Restart** page and restart the iPBridge.

Multiple target nodes

Multiple targets allow you to create a more configurable mapping scheme which can segregate storage into different iSCSI nodes within the iPBridge, with each iSCSI target having its own set of access criteria.

For example, if you have two servers and a library with four tapes and a media changer, the default node would provide both servers access to all tapes and the media changer (default target mode).

If you configured multiple target nodes, you are able to map some devices to one server and other devices to the other server, requiring separate user names and passwords for access using various methods including Access Control Lists, iSNS and CHAP authentication. Consult with your network administrator and refer to Exhibit 3.1-1.

Note

If actual storage is mapped to more than one iSCSI target and a server has authorization for both targets, the server could show duplicate storage without any warning to the user.

You may use either of two methods to control access to storage: Access Control Lists or CHAP authentication.

Access Control lists: each target iqn has its own access control. The iPBridge will check the initiator's iqn before allowing access.

CHAP to control access: different CHAP account names and CHAP secrets are assigned to each target.

Automatically configure multiple targets

1 If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.

1 The **Status** page appears. Click on the **Auto Target Mgt** menu item on the left side of the screen.

2 Click on the **Map each device to its own target** button.

A target name suffix will be added to the iqn of each Fibre Channel device such as

```
vendorid-devicename-xxx
```

- **vendorid** is the Fibre Channel device vendor ID
- **devicename** is the Fibre Channel device's inquiry device name
- **xxx** is a device index

When the action is complete, the screen will go to the **iSCSI Target Management** page.
If you are prompted to restart the iPBridge, go to the **Firmware Restart** page and restart the iPBridge.

Manually configure multiple target nodes

1 If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.

2 The **Status** page appears. Select the **Auto Target Mgt** menu item on the left side of the screen.

3 In the **iSCSI Target Management** page, type **[name]** in the **Add an iSCSI target** box

The name is a suffix appended to the standard IPBridge iqn name. The suffix name can be up to 24 characters.

4 Click on the device map link of your target.

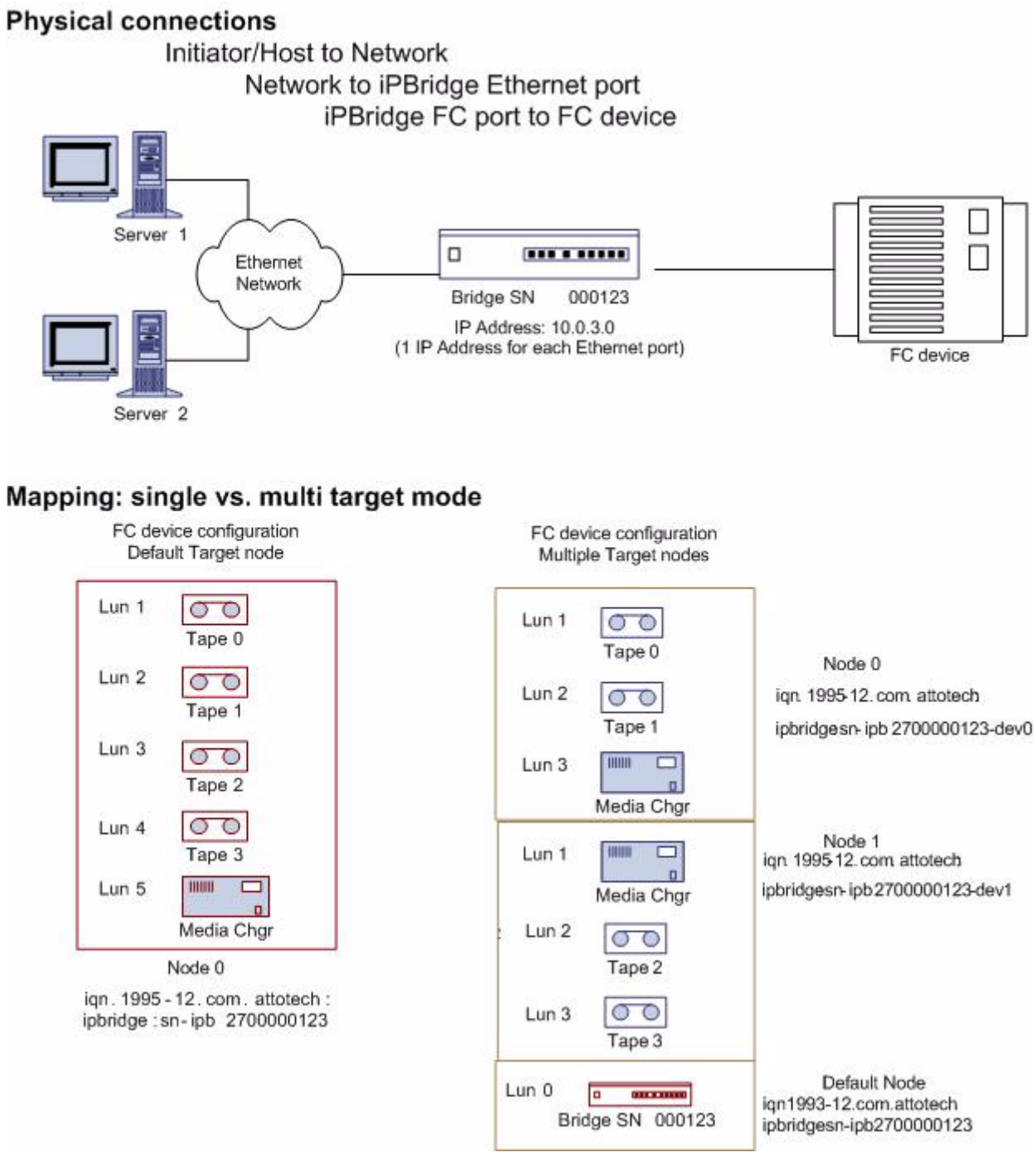
5 After the next mapping page opens, drag the boxes representing devices to the LUNs you want.

6 Click **Submit**.

7 Repeat from Step 3 for each node you want to configure.

8 If you are prompted to restart the iPBridge, go to the **Firmware Restart** page and restart the iPBridge.

Exhibit 3.1-1 Target node configurations.



3.2 iSCSI Configuration

You may fine-tune the iPBridge using the ATTO ExpressNAV interface.

Several special iPBridge features may be accessed using the ExpressNAV graphical user interface. For details on each command, refer to CLI provides an ASCII-based interface on page i of the Appendix

1 If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.

2 The **Status** page appears. Click on the menu item which regulates the parameter you wish to change.
   - Ethernet: iSCSI port number
   - iSCSI iSCSI Alias, ISNS Login Control, iSNSServer, Speedwrite
   - CHAP commands: iSCSI Chap Secret, iSCSI Target through the **Manual Target Mgt** menu

3 Click **Submit** on each page after you have made changes to save your choices. When you have completed all changes, go to the **Restart** page and click on **Restart**.

Ethernet

Click on the **Ethernet** menu item.

iSCSI Port Number

Specifies the port number whereby the iPBridge listens for iSCSI connections. The port number must be between 1024 and 65535 except for port 860. The default is 3260.

iSCSI

Click on the **iSCSI** menu item.

iSCSI Alias

Provides a human-readable name assigned to the iPBridge. Aliases may be 1 to 64 characters long and may contain spaces if spaces are enclosed in quotation marks. The default is a blank space.

iSNS Login Control

Specifies whether the iPBridge will delegate its access control/authorization to an iSNS server. Default is disabled.

Note

*iSNS Login Control cannot be used with Access Control found on the **iSCSI Target Management** page.*

iSNSServer

Specifies whether the IP address of a valid iSNS server from which the iPBridge will attempt iSCSI initiator discovery. Setting to 0.0.0.0 disables the iSNS server lookup. Default is 0.0.0.0.

SpeedWrite

When enabled, improves the performance of WRITE commands to devices attached to the iPBridge.

CHAP commands

To find the CHAP commands,

1 Click on the **Manual Target Mgt** menu item.

2 Click on the **Target Management** page.

3 Click on the **iSCSI CHAP** table entry next to the iSCSI target you wish to use.

iSCSI CHAP

iSCSI CHAP controls whether CHAP (Challenge Handshake Authentication Protocol) is used for the iSCSI protocol. If CHAP is enabled, the target requires the initiator to negotiate CHAP authentication using CHAP secrets (passwords). An initiator may reject this negotiation.

iSCSI Chap Secret

*Specifies the incoming and outgoing secrets (passwords) for iSCSI CHAP sessions. Secrets are case sensitive, 12 to 32 characters (16 for Microsoft iSCSI initiator), and cannot contain spaces. **In** and **out** secrets must be different.*

*An **in** secret is for authentication of the server to the iPBridge. The iPBridge can store up to 32 in secrets.*

*An **out** secret is for authentication of the iPBridge to the server. There is only one out secret per target that cannot be deleted.*

iSCSITarget

Creates or deletes an iSCSI target name. The target name acts as a suffix to the standard bridge iSCSI-qualified name. The target name may not exceed 24 characters.

3.3 Modify System Values

Default values, even if you have not used the ExpressWizard, are appropriate for most configurations, but may be modified.

Preliminary steps

1 If you are not already in the ExpressNAV interface, type the IP address of your iPBridge in a standard browser as found in Using ExpressNAV on page 27, click **Enter Here,** type in your user name and password, and click **OK**.

2 The **Status** page appears.

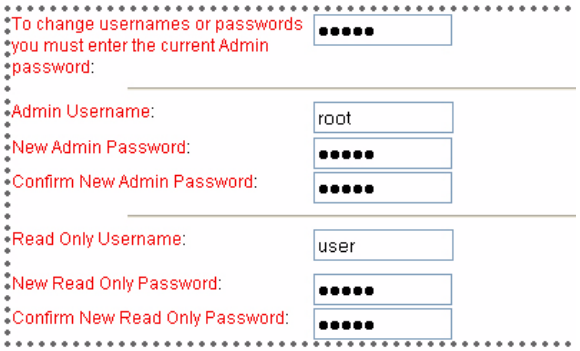
View the default settings by clicking on each element in the left hand menu, then use the individual pages listed on the side menu to make changes or use other features.

Modify passwords

1 Follow the Preliminary steps

2 Click **Bridge**.

The **Bridge Configuration** page is displayed.



The Administrator user name that you are currently logged in with and the current read only user name, if present, are displayed in their text boxes.

3 Enter the Administrator (Admin) password where indicated.

4 Enter appropriate information into the **New Admin Password, Confirm New Admin Password** or **New Read Only Password** and **Confirm New Read Only Password** text boxes.

5 Click **Submit.**

6 Go to the **Restart** page and restart the iPBridge.

Set up a VLAN: Virtual Local Area Network

A Virtual LAN (VLAN) is a group of devices on the same physical LAN which can communicate with each other as if they were all on different physical LANs. This creates a network that is independent of physical location, allows grouping of users into logical workgroups, increases efficient use of resources, and adds security options by allowing some users into the LAN and keeping other users out.

You may create up to eight Virtual LAN IDs for each Ethernet data port. Each VLAN ID is assigned a VLAN name of up to 64 characters. If no VLAN Id exists for a data port, VLAN is disabled for that port.

1 Follow the Preliminary steps.

2 Click on the **Ethernet** menu item.

3 The **Ethernet Port Configuration** page appears. Add a VLAN ID number and name in the appropriate boxes.

4 Press **Submit.**

5 Go to the **Restart** page and restart the iPBridge.

After rebooting, Virtual LAN takes effect.

Once VLAN has been enabled on a data port, some features require a VLAN ID to be specified for that port: SNTP (see **Time & Date** page), SNMP Traps and Email Notification (see **Remote Management** page), and iSNS Server (see **iSCSI** page).

Enhance performance

Note

If you used ExpressWizard to set up your iPBridge, changing these parameters may interfere with ExpressWizard settings.

Default values, even if you have not used the ExpressWizard, are appropriate for most configurations, but may be modified.

1 Follow the Preliminary steps.
2 On the **iSCSI** page, enable **SpeedWrite.**
3 On the **Ethernet** page, change **MTU** to **9014.**

Note

If you change the MTU on the iPBridge, you must enable jumbo frames on your initiator and change the MTU on the initiator.

4 For Windows operating systems, use the ATTO iSCSI performance configuration tool (Windows only).

iSCSI performance configuration tool (Windows only)

The ATTO iSCSI performance configuration tool changes the Windows registry parameters for Microsoft iSCSI Initiator and TCP/IP to enhance overall data throughput.

1 From the CD which came with your iPBridge, copy the **Perftune.exe** file to your hard drive.
2 Execute the program.
3 Click on **Use ATTO Performance Settings**. Settings take effect on the next system reboot.

The following settings are affected:

FirstBurstLength

The maximum amount, in bytes, of unsolicited data an iSCSI initiator may send to the target during the execution of a single command including the immediate data and the sequence of unsolicited Data-Out PDUs which follow the command. ***FirstBurstLength*** *cannot exceed MaxBurstLength*

ATTO value: 1048576 decimal 00100000 hex

MaxBurstLength

The maximum data payload, in bytes, in a Data-In or a solicited Data-Out iSCSI sequence. A sequence consists of one or more consecutive Data-In or Data-Out PDUs that end with a Data-In or Data-Out PDU with the F bit set to one.

ATTO value: 1048576 decimal 00100000 hex

MaxRecvDataSegmentLength

The maximum data segment length, in bytes, that a transmitter (initiator or target) can receive in an iSCSI PDU. The transmitter is required to send PDUs with a data segment that does not exceed ***MaxRecvDataSegmentLength*** *of the receiver.*

ATTO value: 1048576 decimal 00100000 hex

MaxTransferLength

The maximum number of bytes that may be transferred by a single request block (SRB).

ATTO value 1048576 decimal 00100000 hex

SrbTimeoutDelta

The maximum amount of time, in seconds, before an SRB request will time out.

ATTO value 300 decimal 0000012c hex

Tcp1323Opts

This parameter controls RFC 1323 time stamps and window-scaling options. Time stamps and window scaling are enabled by default, but can be manipulated with flag bits. Bit 0 controls window scaling and bit 1 controls time stamps.

ATTO value: 1

4 Remote System Monitoring

You may set up the iPBridge to send notifications when certain events occur.

You may set up the iPBridge to send notifications when certain events occur using the **Remote Management** page of the ExpressNAV interface.

You designate the person receiving notification of conditions and the level of severity which prompt notification using the Simple Network Management Protocol (SNMP) or Email notification.

For both methods, the severity level which is report can be **critical, warning or all**.

- **Critical** means only critical event notifications are sent.
- **Warning** means only warnings and critical event notifications are sent.
- **All** means warnings, critical events and informational messages are sent.

SNMP

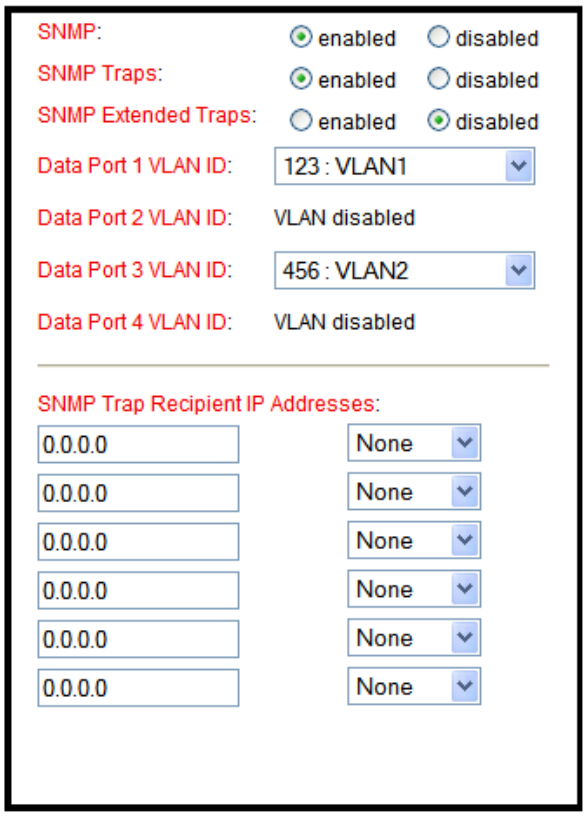
An agent resides in the iPBridge which takes information from the iPBridge and translates it into a form compatible with SNMP. If certain conditions arise, the agent sends notifications (traps) to a client.

Contact your network administrator for the MIB software and appropriate MIB file for your iPBridge.

1 Follow the Preliminary steps on page 15.

2 Click on **Remote Mgt** from the side menu. The **Remote Management** page appears.

3 In the **SNMP** line, click on the **enabled** button.


SNMP: enabled disabled
SNMP Traps: enabled disabled
SNMP Extended Traps: enabled disabled
Data Port 1 VLAN ID: 123 : VLAN1
Data Port 2 VLAN ID: VLAN disabled
Data Port 3 VLAN ID: 456 : VLAN2
Data Port 4 VLAN ID: VLAN disabled
SNMP Trap Recipient IP Addresses:
0.0.0.0 None
0.0.0.0 None
0.0.0.0 None
0.0.0.0 None
0.0.0.0 None
0.0.0.0 None

4 In the **SNMP Traps** or SNMP **Extended Traps** line, click on **Enable.** For details, refer to SNTP and SNMPExtendedTraps on page xi of the Appendix.

5 If VLAN has been enabled, specify the VLAN ID to be used by SNMP Traps for each data port.

6 In the **SNMP Trap Recipient IP addresses** section, enter the IP address of each person you want to notify.

7 From the drop-down box next to each trap address, select the level of severity for which you want each address to be notified: **None**, **All**, **Critical** or **Warning**.

8 Click on **Submit.**

9 Go to the **Restart** page and restart the iPBridge. After rebooting, the iPBridge sends notifications as you set them up.

Email notification

Email notification allows the iPBridge to send an Email message to you, a network administrator or other users when certain events occur with the iPBridge. Serious error messages are sent immediately, while messages for less serious errors are sent every 15 minutes.

You may send Emails to up to five Email addresses and designate which conditions prompt each Email notification.

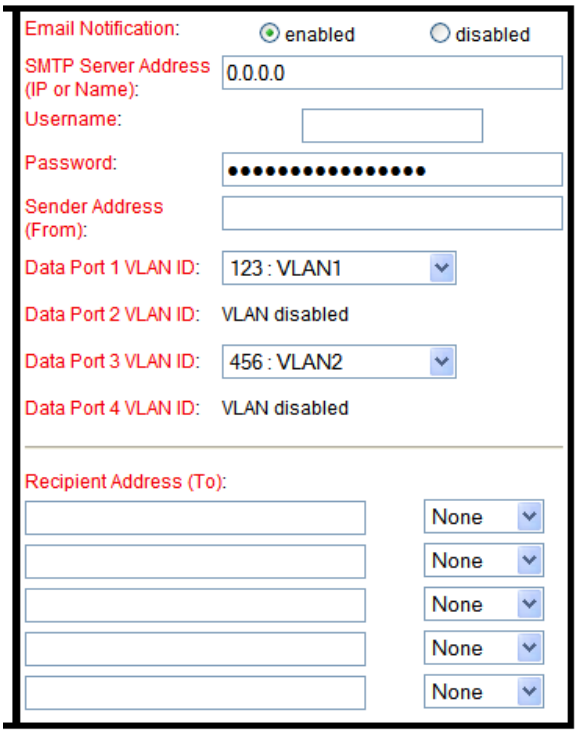
For example, a recipient with a critical severity level only receives critical messages and not warning or informational messages.

When an event occurs that warrants Email notification, the iPBridge sends the message; it cannot respond to a rejection by a server for an invalid address. Ensure all Email addresses typed in are valid.

1 Follow the Preliminary steps on page 15.

2 Click on **Remote Mgt** from the side menu. The **Remote Management** page appears

3 Click on the **Enabled** button for **Email Notification**.



4 Type in the sender address (Emails show this name in the **From** field).

5 If VLAN has been enabled, specify the VLAN ID to be used by Email notification for each data port.

6 Type in the **SMTP Server IP Address.**

7 Type in the user name and password of your SMTP Email account.

8 Type in up to five Email addresses.

9 From the drop-down box, choose **None**, **All**, **Critical** or **Warning** for each Email address.

10 Click on **Submit.**

11 Go to the **Restart** page and restart the iPBridge. After rebooting, the iPBridge sends notifications as you set them up.

5 Updating Firmware

Several processors control the flow of data in the ATTO iPBridge. The firmware to control these processors can easily be upgraded in the field.

The iPBridge firmware is distributed as an .ima file can be obtained from the ATTO Technology, Inc. web site at **www.attotech.com** or from the CD included with your iPBridge.

CAUTION

Before beginning this procedure, ensure that all I/O to the iPBridge has stopped.

During this procedure*, do not* interrupt the flash process.

***Do not* power down the host or the iPBridge until the display returns the Ready prompt.**

Interrupting the flash process will make your iPBridge inoperable and you must return it to ATTO Technology for repair.

Using ATTO ExpressNAV

1 If you have not already, open an ExpressNAV session. For instructions, refer to Opening an ExpressNAV session on page 27.

2 Click on the **Firmware** page.

3 Click **Browse** and locate the firmware you downloaded from the website or from the CD.

A sample filename:

```
c:\bridge_firmware\ibrg0370.ima
```

4 Click **Upload** and wait until a success message is displayed.

5 Click the **Restart** link.

6 Click on **Restart**.

Using FTP

1 Establish an FTP link to the bridge that is to be flashed.

2 Use the **PUT** command to download the firmware file. A sample filename:

```
c:\bridge_firmware\ibrg0370.ima
```

3 Once the download is complete, cycle power on the iPBridge to activate the new firmware.

6 Troubleshooting

If it is clear that a particular component system is at fault in a problem situation, go directly to that component. If it is not clear, the best approach is to troubleshoot using the inside-out method.

You may check on the status of your iPBridge using the ExpressNAV interface. Refer to Using ExpressNAV on page 27. You may also look for information by using the diagnostic CLI commands, in the **Advanced** page of the ExpressNAV interface, or by using the CLI directly (refer to CLI provides an ASCII-based interface on page i of the Appendix.

Inside out method

To troubleshoot using the inside out method, begin with the device(s) connected to the iPBridge first, then work your way out:

- Fibre devices
  - iPBridge Fibre ports
    - iPBridge internal configuration
      - iPBridge Ethernet/iSCSI ports
        - LAN/WAN
          - Ethernet host adapter or NIC in host
            - Initiator
              - OS
                - Application

Check basic diagnostic tools

Check the host event log

Check the event log on the host. Look for the most recent entries and determine what could be causing a problem, then go to that event and continue troubleshooting.

Check the event and trace logs

Check the iPBridge event log through the **Advanced** page of the ExpressNAV interface or through CLI. Look for the most recent entries and determine what could be causing a problem. Then go to that event and continue troubleshooting.

Visually inspect LEDs

If a non-fatal power supply problem occurs, or if a problem is detected before shut down occurs, the bicolor Ready/Fault LED flashes on the front and back (connector) sides of the iPBridge 2700R/D and on the front faceplate of the iPBridge 2700C. The Fault LED also flashes briefly during start up. Off means not ready, green on means ready, and yellow on means faulted.

Inspect the iPBridge 2700C faceplate and iPBridge 2700R/D back (connector side) LEDs (see Exhibit 6.0-1 and Exhibit 6.0-2):

- a lighted green LED, embedded in the connector of the Ethernet management port, indicates a valid link. Off shows that no link is present.
- a blinking yellow LED, embedded in the connector of the Ethernet management port, indicates activity.
- a bicolor LED, embedded in the connector on each Gigabit Ethernet port, indicates 100/1000 Mb/sec. speed. Green on indicates 100 Mb/sec. and yellow on indicates 1000 Mb/sec.
- a green LED for each Gigabit Ethernet port indicates link/activity, where on solid indicates link, blinking indicates activity and off is no link is present.
- a green LED for each Fibre Channel port indicates link where off means no link.
- a separate lighted green LED for each Fibre Channel port shows activity and an unlit LED means no activity.

Inspect the front side LEDs (iPBridge 2700R/D only) (see Exhibit 6.0-2):

- a green power LED; on means power is on; off means power is off.
- a yellow LED on each Ethernet port indicates 100/1000 Mb/sec. speed, where off means 100 Mb/sec. and on means 1000 Mb/sec.
- a green LED on each Ethernet port activity, where off means no activity and on means activity.
- a bicolor LED on each Fibre Channel port indicates FC speed. Off is 1G FC, green is 2G FC and yellow indicates 4G FC.
- a green LED on each Fibre Channel port indicates activity, where off means no activity and on means activity.

Check for problems on attached devices

Check the following in order to find problems on attached devices:

- LEDs
- Display panels
- Firmware levels
- Operability

Check host versions

Check the following to find problems on attached hosts:

- Operating system version
- Service pack version
- Host adapter version
- Host adapter firmware version
- Host adapter device driver version
- iSCSI driver version

If an update is required, perform the update. For an updated list of supported iPBridge host platforms and host adapters, visit **www.attotech.com**.

Check iPBridge product versions and update firmware

1 Enter ATTO ExpressNAV.

2 Check the version numbers on the **Status** page.

3 For a current list of updates, visit **www.attotech.com.**

If an update is needed, download the update from **www.attotech.com**.

4 Go to the **Firmware Update** page in ATTO ExpressNAV and follow the instructions in Updating Firmware on page 19.

If the update does not work, use the FTP method to download the firmware update and verify that your FTP client is set for binary mode

Exhibit 6.0-1 iPBridge 2700C faceplate

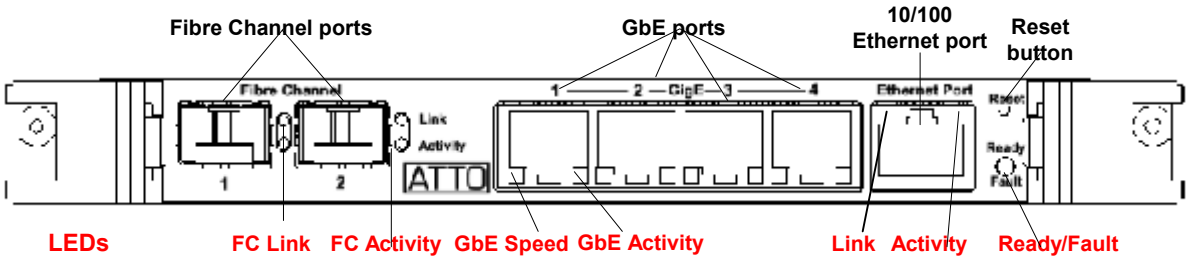
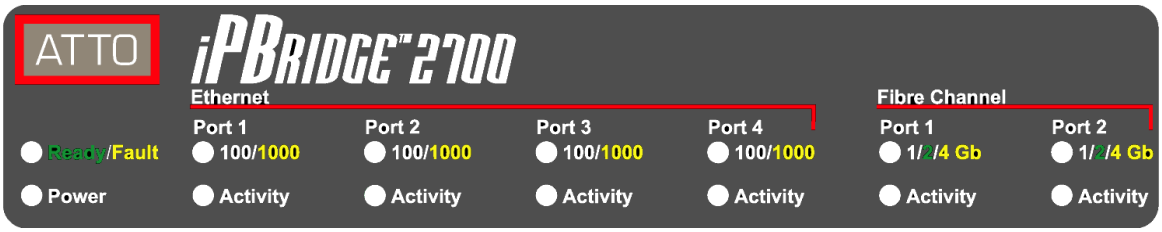


Exhibit 6.0-2 iPBridge 2700 R/D front label



Check components

Use this procedure to check system components. For more information on the commands used in this procedure, refer to CLI provides an ASCII-based interface on page i of the Appendix.

Check Fibre Channel devices

1. Check Fibre Channel device power. Make sure the devices are powering up.
2. Watch the drive lights before, during, and after startup.
3. Check cable integrity. Check the cables for solid connections.
4. If the problem persists, try drives one at a time with different cables, adding drives and cables until the problem occurs. This helps pinpoint the drive or cable causing the problem.
5. Check with the manufacturer of the device(s) for further troubleshooting methods.

If Fibre Channel devices appear to be working order, move on to the iPBridge Fibre Channel port section.

Check the iPBridge FC ports

1. Either through the ATTO ExpressNAV or CLI, check the devices on each port.

   If no devices appear, re-check cables. If garbage information appears, the problem is most likely a bad cable.
2. Check the internal cabling of the device.
3. If all devices appear, invoke the **FCTargets** command several times on each port to verify that the devices can be seen. If devices appear and disappear, then appear again, the problem is most likely a cable. For information on the **FCTargets** command, refer to FCPortList on page vii of the Appendix.

If all devices appear and remain, move to the iPBridge internal configuration section.

When changing any setting on the iPBridge, the configuration must be saved by clicking on the **Save** button on the ATTO ExpressNAV interface screen or using the **saveConfiguration** CLI command.

Check the serial port

1. Verify you have the correct settings and that your terminal is configured to:
   - Baud rate: 115200
   - Data bits: 8
   - Stop bits: 1
   - Parity: off
   - Flow control: None
   - Echo: off
2. Verify that your serial cable is less then two meters in length.

Check iPBridge internal configuration

Verify that the Fibre Channel devices are mapped properly using the ATTO ExpressNAV interface. If devices do not appear, power down the iPBridge and power back on. Refer to Using ExpressNAV on page 27 and Target Management on page 11.

When changing any setting on the iPBridge, the configuration must be saved by clicking on the **Save** button on the ATTO ExpressNAV interface screen or using the **saveConfiguration** CLI command.

Check iPBridge iSCSI ports

1. Check Ethernet cable integrity. Check the cables for solid connections. Cat5 cable can cause connection issues with Gigabit Ethernet. Cat5E and Cat6 cable are the best cabling for the iPBridge.
2. Verify the IP address, subnet mask, and gateway are properly set on each data port on the iPBridge for your network environment. Refer to Using ExpressNAV on page 27.
3. Verify that the Ethernet speed is set to auto: check the **Ethernet** page of the ATTO ExpressNAV interface, or check the LED link lights to determine if the Ethernet speed is correct. Refer to Visually inspect LEDs on page 20.
4. Determine if the iPBridge is set to get its IP information from a DHCP server. If so, verify that the DHCP server has available IP addresses.
5. Verify that each used Ethernet port on the iPBridge can be pinged from the desired host. Refer to Ping on page x of the Appendix.

   If the host cannot ping the iPBridge ports and the iPBridge ports are properly configured, continue to the Local Area Network/Wide Area Network section, Check the LAN/WAN on page 23.

   Verify that each port on the iPBridge can ping each desired host. Refer to Ping on page x of the Appendix. If the iPBridge cannot ping the host, continue to Check the LAN/WAN on page 23.

6 If using DHCP (the default), verify that the DHCP server is assigning the correct IP information to the host.
7 Verify VLAN IDs are either disabled or are set up identically on the iPBridge and the connecting switch.
8 Some older switches/hosts cannot auto negotiate between the iPBridge and the switch/host at the desired speed. You may have to force the host/switch or the iPBridge to the desired speed.
9 Verify that the host is logging into the iPBridge correctly by viewing the **Connections** page and determining if there a “session open” status.
10 Verify that you are using the correct login procedure for your initiator. For example: When connecting using the Adaptec initiator, the log on screen requests the iPBridge iqn (iSCSI qualified name). If left blank, Adaptec will not be able to log in. Enter “iSCSI” into this field for auto iqn discovery.

When changing any setting on the iPBridge, the configuration must be saved by clicking on the **Save** button on the ATTO ExpressNAV interface screen or using the **saveConfiguration** CLI command.

Check the LAN/WAN

1 Verify that the switch/switches are segmented properly so that hosts and the iPBridge have access to each other.
2 If there are routers involved in the setup, make sure the IP addresses and/or MAC addresses of the iPBridge are allowed through the router.
3 Verify that the switch can see the iPBridge on the port(s) in question. Refer to your switch vendor’s guide for more information.

Check the iSCSI Host Adapter or NIC

iSCSI host adapters appear as a type of Storage Controller to the host OS, not as a standard NIC. These adapters usually have hardware acceleration to offload the TCP processing from the host. Configuration of these adapters is usually done through the vendor’s own utility and not through the OS itself.

NICs come in two types: accelerated and un-accelerated. Accelerated NICs use some hardware to offload some of the TCP processing from the host. Un-accelerated NICs make the OS do all TCP processing.

To check the iSCSI host adapter or NIC:

1 Check cable integrity. Check the cables for solid connections. Make sure they are plugged in properly. Inspect cable ends for broken clips and improper wiring.
2 Verify that the iSCSI host adapter or NIC is configured with the correct IP information.
3 If using DHCP, verify that the DHCP server is assigning the correct IP information to the host.
4 Verify that the hosts are running the recommended driver and firmware level for the iSCSI host adapter or NIC vendor.
5 Verify that the hosts and the iPBridge Ethernet port in use are using the same port number to communicate iSCSI. Check the ATTO ExpressNAV **iSCSI** page. The default port number for all ports on the iPBridge is 3260.
6 Make sure the host adapter/NIC is configured to log into the iPBridge. Some iSCSI host adapters do not re-login upon reboot or unplug/replug event without marking a check box.
7 Some older switches cannot autonegotiate between the host and the switch properly. You could have to force the host or switch to the desired speed.

For a NIC using an OS iSCSI driver, continue to the iSCSI OS driver section.

Check the iSCSI OS driver

If the host uses a driver that allows the OS to talk to iSCSI targets via a NIC, not an iSCSI storage adapter:

1 A PC using an iSCSI storage adapter and an iSCSI OS driver might not work correctly on the same machine. Check with the vendors to make sure they are compatible.
2 Verify that the PC has the latest iSCSI driver as well as the required service packs and patches. Check with the iSCSI OS driver vendor for more information.
3 Verify that the iSCSI OS driver has started. Look under **Device Manager** for Windows or **lsmod** for Linux.
4 Verify that the iSCSI OS is still looking for the iPBridge at the right IP address.
5 If using DHCP, verify that the DHCP server is assigning the correct IP information to the host.
6 Verify that the NIC is configured with the correct IP information.
7 Verify that the hosts and the iPBridge are using the same port number to communicate iSCSI

on the ATTO ExpressNAV **iSCSI** page. The default port number for the iPBridge is 3260.

8 Check cable integrity. Check the cables for solid connections. Make sure they are plugged in properly. Inspect cable ends for broken clips and improper wiring.

Check the Operating System

1 Verify that the OS has the required service packs or patches installed. If not, obtain the proper service packs and patches and install them.

2 Some iSCSI host adapters and iSCSI OS drivers do not always automatically find new targets when plugged in or when forced to rescan. Reboot the hosts.

3 Check if the vendor has a new driver. If so, install it.

Check the applications

1 Verify that the application is running the latest device drivers for the devices connected to iPBridge. If not, get the latest device drivers and install them.

2 Verify with the application vendor if the iSCSI technology is supported on the version of the application being used.

Performance Issues

If the host is not getting the performance it should, check the following items.

Check Fibre Channel devices

Verify that the devices are running at their highest possible speed. Refer to FCDataRate on page vii of the Appendix.

Check the iPBridge Ethernet ports

1 Verify that the data port is set to auto negotiate or forced to 1000 Mb/sec. on the ExpressNAV **Ethernet** page.

2 Verify that the MTU size is set to optimal setting for the LAN/WAN environment. 9k frame size is the current optimized frame size for the iPBridge.

3 Verify that the iPBridge **TraceLog** feature is disabled. Tracelog tracks certain events that occur in the iPBridge. With this log enabled, performance suffers. Refer to TraceLog on page xii of the Appendix.

Check the LAN/WAN

1 Verify that the MTU size is set to optimal setting for the LAN/WAN environment on the ATTO ExpressNAV **Ethernet** page.

9k frame size is the current optimized frame size for the iPBridge. Many switch and router vendors do not support the larger frame size of 9k.

2 Verify that each associated port in the IP SAN is configured for 1000Mbs.

IP SAN traffic should be segmented so that it does not interfere with the main LAN network traffic.For better performance, the IP SAN should be on its own set of hardware.

3 Verify that packets are not being dropped along the LAN/WAN. Many utilities track packet activity and switch statistics.

Check the Ethernet host adapter or NIC

Ethernet storage adapters generally outperform accelerated NICs and un-accelerated NICs by offloading most of the processing from the host.

An accelerated NIC provides some offloading, but still requires a host OS iSCSI driver, making the host spend more CPU cycles.

An un-accelerated NIC does not offload anything so the CPU must do much of the processing.

1 Verify that the adapter or NIC is sent to auto-negotiate or forced to 1000 Mbs.

2 Set the MTU size to the largest MTU size supported in the LAN/WAN using the **Ethernet** page in the ATTO ExpressNAV interface.

9k frame size is the current optimized frame size for the iPBridge. Many switch and router vendors do not support the larger frame size of 9k.

3 Set the maximum transfer size to the most efficient size for the intended target(s). For many tape drives, 64k is the optimal setting.

Check applications

Some applications can be configured to change transfer sizes. Configure the application for the optimal

size for the particular device(s) connected to the iPBridge.

Check the host system

The faster the host, the faster your transfer times will be. The work flow goes only as fast as the slowest connection in the host system, so transferring data from an IDE drive, 100Mb connection, a DLT 4000, a high speed RAID volume across the country, or other applications, slows the system no matter how fast everything else is in the system.

1 Verify that the iSCSI storage adapter or NIC is connected to the fastest PCI bus connector supported by the adapter or NIC.

   If the adapter supports PCI-X, place the adapter in a PCI-X slot. If one is not available, the host might not achieve the optimal performance capable from the adapter.

   Even placing a PCI-X adapter into a 64 bit 66 MHz slot loses performance. Some adapters adjust clock speed depending on the speed of the PCI slot into which they are plugged.

2 The host OS disk and swap disk/partition/file should be on a high speed drive to minimize the time needed to access the host's virtual memory.

   The more memory a system has, the less time it spends accessing virtual memory (hard drive space).

Check the Operating System

If possible, eliminate swap space and virtual drives which require large amounts of system memory. However, the OS might not allow the elimination of swap space. An OS set to run many kinds of different servers spends much of its CPU cycles on other operations, thus slowing down performance.

Optimize ATTO ExpressNAV in Internet Explorer

1 Go to the browser toolbar and select **Tools.**
2 Select **Internet Options.**
3 Select the **Security** tab.
4 Select the **Custom Level** button.
5 On the menu presented, go to the **Microsoft VM, Java permissions** and make sure **Disable Java** is *not* selected.
6 Go to the **Miscellaneous** topic and select **METAREFRESH**.

Use the ATTO iSCSI performance configuration tool for Windows

The ATTO iSCSI performance configuration tool changes the Windows registry parameters for Microsoft iSCSI Initiator and TCP/IP to enhance overall data throughput.

1 From the CD which came with your iPBridge, copy the **Perftune.exe** file to your hard drive.
2 Execute the program.
3 Click on **Use ATTO Performance Settings**. Settings take effect on the next system reboot.

The following settings are affected:

FirstBurstLength

The maximum amount, in bytes, of unsolicited data an iSCSI initiator may send to the target during the execution of a single command including the immediate data and the sequence of unsolicited Data-Out PDUs which follow the command. ***FirstBurstLength*** *cannot exceed MaxBurstLength.*

ATTO value: 1048576 decimal 00100000 hex

MaxBurstLength

The maximum data payload, in bytes, in a Data-In or a solicited Data-Out iSCSI sequence. A sequence consists of one or more consecutive Data-In or Data-Out PDUs that end with a Data-In or Data-Out PDU with the F bit set to one.

ATTO value: 1048576 decimal 00100000 hex

MaxRecvDataSegmentLength

The maximum data segment length, in bytes, that a transmitter (initiator or target) can receive in an iSCSI PDU. The transmitter is required to send PDUs with a data segment that does not exceed ***MaxRecvDataSegmentLength*** *of the receiver.*

ATTO value: 1048576 decimal 00100000 hex

MaxTransferLength

The maximum number of bytes that may be transferred by a single request block (SRB).

ATTO value 1048576 decimal 00100000 hex

SrbTimeoutDelta

The maximum amount of time, in seconds, before an SRB request will time out.

ATTO value 300 decimal 0000012c hex

Tcp1323Opts

This parameter controls RFC 1323 time stamps and window-scaling options. Time stamps and window scaling are enabled by default, but can be manipulated with flag bits. Bit 0 controls window scaling and bit 1 controls time stamps.

ATTO value: 1

Reset/restore factory default

To reset the iPBridge, briefly insert a tool in the hole in the back panel for less than three seconds. See Exhibit 6.0-1.

To restore factory defaults, insert the tool in the hole in the back panel for more than four seconds until the green Ready LED blinks.

7 Interface Options

Alternative methods to the ATTO ExpressNAV interface may be used to manage the iPBridge. ATTO ExpressNAV is the recommended interface.

Using ExpressNAV

Each page in the ATTO ExpressNAV interface provides information and/or configuration parameters based on a specific topic.

ATTO ExpressNAV is the recommended management tool for the iPBridge. It is a web-based graphical user interface (GUI) that allows you to manage the iPBridge by clicking choices and commands in traditional GUI fashion or by entering CLI commands directly, as you would in a terminal emulation session, on the **Advanced CLI** page.

Opening an ExpressNAV session

1 Point your browser at the IP address of the iPBridge. Refer to Discovering the IP address on page 7.

2 The ExpressNAV home page is displayed. Click **Enter**.

3 Enter the user name and password values.

Note

*The default values are user name: **root** and password: **Password**. The user name is case insensitive and password is case sensitive. It is best practice to change user names and passwords. Refer to Modify passwords on page 15.*

The **Status** page appears.

Each page can be reached through the menu at the side of each page. An image on each page's header shows each port in the product faceplate. Each port is clickable and takes you to the appropriate page.

If you have completed configuration operations at any time and have clicked **Submit** on the page you are viewing, go to the **Restart** page and restart the iPBridge to save the settings.

If you have not completed configuration changes, go on to the next command.

Optimizing ExpressNAV in Internet Explorer

1 Go to the browser toolbar and select **Tools**

2 Select **Internet Options**

3 Select the **Security** tab

4 Select the **Custom Level** button.

5 On the menu presented, go to the **Microsoft VM, Java permissions** and make sure **Disable Java** is *not* selected.

6 Go to the **Miscellaneous** topic and select **METAREFRESH**.

Using the serial port

1 Connect a cable from iPBridge RS-232 serial port to the serial (COM) port on a personal computer.

2 Turn on the iPBridge.

3 Start a terminal emulation program on the personal computer, and use it to connect to the iPBridge. For example, if you are using HyperTerminal on a computer running a Windows operating system,

   a. Type **iPBridge** in the **New Connection** dialog box.

   b. Click **OK**.

   c. In the **Connect To** dialog box, for the **Connect using field** select the COM port number to which your serial cable is connected.

   d. Click **OK**.

   e. In the COM Properties dialog box select the following values:

   - Bits per second: 115200
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
   - Flow Control: None
   - Terminal type: ASCII
   - Echo: off

f. Click **OK.**

4 After you connect to the iPBridge, start-up messages are displayed. These messages are only displayed at start-up. The last line in the start-up message sequence is **Ready**.

5 In serial port sessions, there is no prompt on the line below the word **Ready**. Begin typing commands in the blank line where the cursor is resting. No user name or password is required for serial port access.

6 To verify that you have connected successfully, type **help** after the **Ready** prompt and press **Enter.**

- If a list of all available commands does not appear on the screen, review the steps in this section, check the cable, or contact service personnel until the problem is solved.

If you have difficulty using the serial port, verify that you have the correct settings and that your serial cable is less then two meters in length.

Using Telnet

Up to three Telnet sessions can be conducted simultaneously. A serial port session can use the CLI while Telnet sessions are open. Whichever session issues the first **set** CLI command can continue to issue set commands, while the other sessions can only issue **get** commands or display information. Once a connection is established, refer to CLI provides an ASCII-based interface on page i of the Appendix.

1 Connect to the iPBridge from a computer on the same Ethernet network.

2 Start a Telnet session.

Note

There is more than one way to connect to the iPBridge using a telnet program.Your telnet program may operate differently than in the following instructions.

3 At the telnet prompt, issue the **open** command where x.x.x.x is the IP address of the iPBridge.

```
telnet > open x.x.x.x
```

4 If you have to specify a port type, enter the port type “telnet” and the terminal type “vt100”.

```
port type: telnet
terminal type: vt100
```

5 Enter the default values for the user name, **root**, and the password**, Password**, if you did not set new values in Modify passwords on page 15.

Appendix A CLI provides an ASCII-based interface

The command line interface (CLI) uses ASCII commands typed while in CLI mode.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.

Changing parameters may cause loss of data and/or disruption to performance and reliability of the iPBridge.

The ExpressNAV interface is the preferred method to operate and manage the iPBridge. Refer to Using ExpressNAV on page 27 for details.

The command line interface (CLI) is a set of ASCII-based commands which perform configuration and diagnostic tasks. Refer to Interface Options on page 27.

- CLI commands are context sensitive and generally follow a standard format

```
[Get|Set] Command [Parameter1|Parameter2]
```

  followed by the **return** or **enter** key
- CLI commands are case insensitive: you may type all upper or all lower case or a mixture. Upper and lower case in this manual and the **help** screen are for clarification only.
- Commands generally have three types of operation: get, set and immediate.
- The get form returns the value of a parameter or setting and is an informational command.
- Responses to get commands are followed by **Ready**.
- The set form is an action that changes the value of a parameter or configuration setting. It may require a **SaveConfiguration** command and a restart of the system before it is implemented. The restart can be accomplished as part of the **SaveConfiguration** command or by using a separate **FirmwareRestart** command. A number of set commands may be issued before the **SaveConfiguration** command.
- Responses to **set** commands are either an error message or **Ready. *.** The asterisk indicates you must use a **SaveConfiguration** command to finalize the **set** command.
- Set commands which do not require a **SaveConfiguration** command, defined as immediate commands, are immediately executed.

Note

Using certain CLI commands during normal operation can cause a performance drop. Once command actions are complete, performance should return to normal levels.

Exhibit A-1 Symbols, typefaces and abbreviations used to indicate functions and elements of the command line interface used in this manual.

Symbol	Indicates
[ ]	Required entry
< >	Optional entry
|	pick one of
-	a range (6 – 9 = 6, 7, 8, 9)
DPn	Ethernet data port (1<= dp <= 4)
MPn	Ethernet management port (n=1)
FC	Fibre Channel
fp	Fibre Channel port number (1<= fp <= 2)
fl	Fibre Channel LUN (0 <= fl <= 63)

CLI error messages

The following error messages may be returned by the Command line Interface

```
ERROR. Invalid Command. Type 'Help' for command list.
ERROR. Wrong/Missing Parameters
Usage: <usage string>
ERROR Invalid RAID Group state
ERROR Invalid Block Device index
ERROR Invalid RAID Member index
ERROR Maximum number of RAID Groups exceeded
ERROR Insufficient number of RAID Group members
ERROR
Block Device at specified index no longer available
ERROR Insufficient RAID Group members for RAID type
```

CLI summary

The following chart summarizes the Command Line Interface commands, their defaults, and an example of how to enter the commands. Commands which have no default values have a blank entry in that column of the table.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.

Changing parameters may cause loss of data and/or disruption to performance and reliability of the iPBridge.

The ExpressNAV interface is the preferred method to operate and manage the iPBridge. Refer to Using ExpressNAV on page 27 for details.

Command	Default	Example
AccessControl	disabled for default node enabled for all other nodes	set accesscontrol default enabled
AccessEntry		get accessentry default all delete
AutoMap		automap
BridgeModel		get bridgemodel
BridgeName	iPBridge	set bridgename Omega6
ClearEventLog		clearеventlog
ClearTraceLog		cleartracelog
Date		set date 03/03/2005
DeleteAllMaps		deleteallmaps
DisplayEventLog		displayeventlog
DisplayEventLogFilter	all all all	set displayeventlogfilter gen info all
DisplayTraceLog		displaytracelog
DisplayTraceLogFilter	all all all	set displaytracelogfilter all all chkcond
DPMTU	1514	set dpmtu all 9014
DumpConfiguration		dumpconfiguration
DumpEventLog		dumpeventlog
DumpTraceLog		dumptracelog
EmailFromAddress		set emailfromaddress notify1@attotech.com
EmailNotify	disabled	set emailnotify enabled
EmailNotifyAddress		get emailnotifyaddress

Command	Default	Example
EmailPassword		set emailpassword
EmailServerAddress	0.0.0.0	get emailserveraddress
EmailUsername		set emailusername barb
EthernetSpeed	auto	set ethernetspeed dp1 100
EventLog	enabled	set eventlog disabled
EventLogFilter	all all all	set eventlogfilter gen info all
Exit		exit
ExpressFairness	enabled	set expressfairness disabled
FCConnMode	loop	set fcconnmode all ptp
FCDataRate	auto	get fcdatarate all
FCHard	disabled	set fchard disabled
FCHardAddress	fp1=3, fp2=4	set fchardaddress 1 122
FCPortErrors		get fcporterrors all
FCPortList		fcportlist
FCTargets		fctargets 1
FCWWName		get fcwwname 1
FirmwareRestart		firmwarerestart
Help		help fcdatarate
IdentifyBridge	disabled	set identifyBridge enabled
Info		info
IPAddress	dp1=10.0.0.1 dp2=10.0.0.2 dp3=10.0.0.3 dp4=10.0.0.4 mp1=10.0.0.5	get ipaddress mp1
IPDHCP	enabled	set ipdhcp mp1 disabled
IPGateway	0.0.0.0	get ipgateway mp1
IPSubnetMask	255.255.0.0	get ipsubnetmask mp1
ISCSIAlias	“ “	set iscsialias diamond
iSCSIChap	disabled	set iscsichap default enabled
iSCSIChapSecret	“ “	set iscsichapsecret default in iqn.1995-05.com.microsoft:barbpc barb123
iSCSIInitiators		iscsiinitiators
iSCSIPortNumber	3260	get iscsiportnumber dp1
iSCSITarget		iscsitarget newtarg
iSCSITargetNameDisplay		iscsitargetnamedisplay
iSCSIWANIPAddress	0.0.0.0	get iSCSIWANIPAddress all
iSNSLoginControl	disabled	set isnslogincontrol enabled
iSNSServer	0.0.0.0	get isnsserver
IsReserved		isreserved
MaxOpTemp	70	get maxoptemp
MinOpTemp	0	set minoptemp 10
OpTempWarn	5	set optempwarn 15
Password	Password	set password
Ping		ping mp1 192.42.155.155

Command	Default	Example
ReadOnlyPassword	Password	set readonlypassword
ReadOnlyUsername	user	set readonlyusername alpha1
ResetFCPortErrors		resetfcporterrors 1
Reserve		reserve
RestoreConfiguration		restoreconfiguration default
RMON	BucketsRequest=50 Interval=1800 Status=invalid	get RMON ethernethistory
Route		route iscsi default 2 FC 1 1
RouteDisplay		routedisplay iscsi
SaveConfiguration		saveconfiguration restart
SerialNumber		get serialnumber
SerialPortBaudRate	115200	set serialportbaudrate 19200
SerialPortEcho	enabled	set serialportecho disabled
SNMP	enabled	set snmp disabled
SNMPDumpMIB		snmpdumpmib
SNMPExtendedTraps	disabled	set snmpextendedtraps enabled
SNMPTrapAddress	IP address = 0.0.0.0 level = none	set snmptrapaddress 6 192.42.155.155 all
SNMPTraps	disabled	set snmptraps enabled
SNTP	enabled	get sntp
SNTPServer	192.43.244.18	set sntpserver 129.6.15.28
SpeedWrite	disabled	get speedwrite FC all enabled
SpeedWriteDefault	disabled	set speedwritedefault enabled
TailEventLog		taileventlog
Temperature		get temperature
Time	00:00:00	set time 03:32:30
TimeZone	EST	set timezone pst
TraceLog	disabled	set tracelog enabled
TraceLogFilter	all all all	set tracelogfilter all all chkcond
Username	root	set username Barbara
VerboseMode	enabled	set verbosemode disabled
VLAN		set vlan dp1 5 alpha1
Voltage		get voltage all
WrapEventLog	enabled	set wrapeventlog disabled
WrapTraceLog	enabled	set wraptracelog disabled

Alphabetical CLI command explanations

AccessControl

Controls access on a target node. Access to the target node is keyed to the iSCSI qualified name of listed initiators.

Note

AccessControl cannot be used with iSNS.

Default: disabled
set AccessControl [default | Target Name] [enabled | disabled]
get AccessControl [default | Target Name]

AccessEntry

*Allows the addition or deletion of an initiator entry from the access control list of a target node. The initiator name must be formatted as an iSCSI qualified name and must be between 1 to 223 characters, is case sensitive and cannot be **all**.*

set AccessEntry [default |Target Name | discovery] [Initiator Name <delete> | all [delete]]
get AccessEntry [default | Target Name | discovery]

AutoMap

*Automatically maps all target devices visible to the iPBridge to iSCSI addresses. If you use no arguments, all devices are mapped to the default target. If you specify a target, all devices are mapped to that target. If you specify *****, each device is mapped to its won auto-named target.*

Automap <default | * | target name>
SaveConfiguration command required

BridgeModel

Reports specific model and firmware information.

get BridgeModel

BridgeName

Specifies the eight-character ASCII name assigned to the iPBridge to identify individual units. It is not the World Wide Name. Changes take effect immediately.

Default: iPBridge
set BridgeName [name]
SaveConfiguration Restart command required
get BridgeName

ClearEventLog

Clears the contents of the event log. No new entries are recorded until the operation is completed.

ClearEventLog

ClearTraceLog

Clears the contents of the TraceLog . No events are recorded until the operation is completed.

ClearTraceLog

Date

Regulates the current date for this iPBridge. The date range is 1/1/2000 to 12/31/2099.

set Date [MM] / [DD] / [YYYY]
get Date

DeleteAllMaps

Removes all mapped devices from the map table. Upon the subsequent POST, the default maps are loaded if no maps are present.

DeleteAllMaps
SaveConfiguration command required

DisplayEventLog

*Displays the EventLog .The event log may be filtered using the DisplayEventLogFilter command. The optional parameter **n** is the number of lines to be displayed as a single page with no user interaction. After the command has executed, use **+, -** or **=** to scroll through the log. Type **quit** and press **Enter** to exit the command.*

DisplayEventLog <n>

DisplayEventLogFilter

*Filters the display of data for specified subsystems and levels during DisplayEventLog mode. Valid event log subsystem entries are platform-dependent. For **set** commands, the final parameter indicates whether or not events from the specified subsystem and level will be displayed.*

Default: all all all
set DisplayEventLogFilter [subsystem | all] [level | all] [all | none]
get DisplayEventLogFilter [subsystem | all] [level | all] [all | none]

DisplayTraceLog

*Displays the most recent page of trace log entries. The optional parameter n is the number of lines to be displayed as a single page with no user interaction. After the command has executed, use **+,** - or **=** to scroll through the log. Type **quit** and press **Enter** to exit the command.*

DisplayTraceLog <n>

DisplayTraceLogFilter
*Filters the display of data for specific ports while in **DisplayTraceLog** mode.*

Default: all all all
set DisplayTraceLogFilter [FC | all] [fp | all] [none | chkcond | all]
get DisplayTraceLogFilter [FC | all] [fp | all]

DPMTU
Controls the MTU, or maximum transmission unit, used by the data port.

Default: 1514
set DPMTU [DPn | all] [1514 | 9014]
get DPMTU [DPn | all]

DumpConfiguration
*Displays the iPBridge configuration to the ExpressNlAV **Advanced** page text box, an available RS-232 or telnet session.Results may be truncated in the ExpressNAV readout.*

DumpConfiguration

DumpEventLog
*Dumps the entire contents of the event log to the ExpressNlAV **Advanced** page text box, an available RS-232 or Telnet session.Results may be truncated in the ExpressNAV readout.*

DumpEventLog

DumpTraceLog
Dumps the entire contents of the Username to the ExpressNlAV Advanced page text box, an available RS-232 or telnet session.

DumpTraceLog

EmailFromAddress
Configures the Email address that the unit uses to communicate with the Email server. Full Email address is a fully qualified Internet Email address, not more than 128 characters long.

set EmailFromAddress [full email address]
get EmailFromAddress

EmailNotify
Regulates Email notification. If VLAN is enabled, the VLAN ID must be provided.

Default: disabled.
set EmailNotify [enabled | disabled] <[DPn] [VLAN ID]>
get EmailNotify

EmailNotifyAddress
*Configures notification addresses. Index is a number between 1 and 5. **Full Email address** is a fully qualified Internet Email address, not more than 128 characters long.*

Warning levels
- None: no Emails are sent
- Critical: only critical severity events engender an Email
- Warning: warnings and critical events precipitate Email
- All: all warnings, critical events and informational messages warrant an Email.

set EmailNotifyAddress [index] [full email address] [warning level]
get EmailNotifyAddress <index | all>

EmailPassword
Configures the password which authenticates the login to the SMTP Email server. The password must not be more than 64 characters. A password is not required if the Email server does not require authentication.

set EmailPassword
SaveConfiguration command required

EmailServerAddress
Configures the address of the server the unit must contact in order to send out Email notifications.

Default: 0.0.0.0
set EmailServerAddress [IP address]
SaveConfiguration command required
get EmailServerAddress

EmailUsername
Configures the user name which authenticates the login to the SMTP Email server. The user name must not be more than 128 characters. A user name is not required if the Email server does not require authentication.

set EmailUsername [username]
SaveConfiguration command required
get EmailUsername

EthernetSpeed
*Regulates the speed of the iPBridge Ethernet port. If **Auto** is enabled, the Ethernet speed is negotiated. When hard set, 100 speed is half duplex.*

Default: auto
set EthernetSpeed [DPn | MPn | all] [100 | 1000 | auto]
get EthernetSpeed [DPn | MPn | all]

EventLog
Regulates event logging. When enabled, the unit records various system events to the event log.

Default: enabled
set EventLog [enabled | disabled]
get EventLog

EventLogFilter
Filters data from specific unit subsystems and levels when EventLog is enabled. The specific entries supported are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level are displayed.

Default: all all all
set EventLogFilter [subsystem | all] [event level | all] [all | none]
get EventLogFilter [subsystem | all] [level | all]

Exit
Terminates the current CLI session over Telnet. This command has no effect if used during a serial CLI session.

Exit

ExpressFairness
Enables an iSCSI fairness algorithm. which, when a large number of hosts are connected using iSCSI, prevents one host from using all available bandwidth and starving other connections.

Default: enabled
set ExpressFairness [enabled | disabled]
get ExpressFairness

FCConnMode
Specifies the connection mode the unit uses when communicating across a Fibre Channel network.

Connection modes:
- FC_AL arbitrated loop: loop
- Point-to-point: ptp
- auto-negotiation, loop preferred: loop-ptp
- auto-negotiation, ptp preferred: ptp-loop:

Default: loop
set FCConnMode [fp] [loop | ptp | loop-ptp | ptp-loop]
SaveConfiguration Restart command required
get FCConnMode [fp | all]

FCDataRate
Specifies the Fibre Channel data rate at which the unit operates. Choices are 1Gb/sec., 2Gb/sec., 4Gb/sec. or Auto-negotiate.

Note

*The FC data rate displayed in the **Info** output toggles between 1Gb, 2Gb and 4Gb on a 4Gb-capable unit if no connection has been established.*

Default: auto
set FCDataRate [fp | all] [1Gb | 2Gb | 4Gb | auto]
SaveConfiguration Restart command required
get FCDataRate [fp | all]

FCHard
Regulates Fibre Channel hard address assignment. When enabled, the unit tries to use its internal hard address as its address on the Fibre Channel loop. Under soft addressing, the unit loop address is assigned during loop initialization.

Default: disabled
set FCHard [enabled | disabled]
SaveConfiguration Restart command required
get FCHard

FCHardAddress
Specifies the value used as the FC-AL hard address, in hexadecimal. This value represents the address the unit tries to use if FCHard is enabled. The range of valid Fibre Channel address values is 0 through 125.

Default: fp1=3; fp2=4
set FCHardAddress [fp] [address]
SaveConfiguration Restart command required
get FCHardAddress [fp | all]

FCPortErrors
Displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or use of the ResetFCPortErrors command.

get FCPortErrors [fp | all]

FCPortList
*Displays a list of available FC ports and their current status. Valid reported status values are **Up, Down, Failed, Reserved** and **Disabled.***

FCPortList

FCTargets
*Lists all target devices available on the Fibre Channel port with the index specified by **fp**. If no port index is specified, then all target devices on all Fibre ports are displayed. A port-unique index is assigned to each target which is used with the **fp** to specify a Fibre Channel target for a subsequent Route CLI command.*

FCTargets <fp>

FCWWName
Reports the World Wide Node Name of the Fibre Channel interface referenced. Each Fibre Channel port has an individual and unique 8-byte Node Name.

get FCWWName [fp | all]

FirmwareRestart
*Resets and reinitializes the iPBridge firmware. Use the **forced** option to override any CLI reservations held by other sessions.*

FirmwareRestart <forced>

Help
Issued with no parameters displays a list of available CLI commands. When a CLI command name is specified, a command usage string and command description are displayed.

Help <Command>

IdentifyBridge
*Causes the **Fault** LED on the iPBridge to blink so that you can identify the iPBridge hardware. Disabling this option cancels the blinking.*

Default: disabled
set IdentifyBridge [enabled | disabled]
get IdentifyBridge

Info
Displays version numbers and other product information for key components within the iPBridge.

Info

IPAddress
Controls the current IP address of the Ethernet ports on the iPBridge. If IPDHCP is enabled, the get command reports the current IP address assigned by the network DHCP server, followed by the (DHCP) identifier.

Default:
dp1=10.0.0.1
dp2=10.0.0.2
dp3=10.0.0.3
dp4=10.0.0.4
mp1=10.0.0.5
set IPAddress [DPn | MPn | all] [xxx.xxx.xxx.xxx]
SaveConfiguration Restart command required
get IPAddress [DPn | MPn | all]

IPDHCP
Regulates how the iPBridge acquires its IP address. When disabled, the iPBridge uses the IP address specified by the IPAddress CLI command.; when enabled, the iPBridge gets its IP address from a DHCP server.

Default: enabled
set IPDHCP [DPn | MPn | all] [enabled | disabled]
SaveConfiguration Restart command required
get IPDHCP [DPn | MPn | all]

IPGateway
*Controls the current default gateways used by any Ethernet ports on the iPBridge. If IPDHCP is enabled, the **get** command reports the current IP gateway assigned by the network DHCP server.*

Default: 0.0.0.0
set IPGateway [DPn | MPn | all] [xxx.xxx.xxx.xxx]
SaveConfiguration Restart command required
get IPGateway [DPn | MPn | all]

IPSubnetMask
Controls the current subnet masks used by any Ethernet ports on the iPBridge. If IPDHCP is enabled, the get command reports the current IP subnet mask assigned by the network DHCP server.

Default: 255.255.0.0
set IPSubnetMask [DPn | MPn | all] [xxx.xxx.xxx.xxx]
SaveConfiguration Restart command required
get IPSubnetMask [DPn | MPn | all]

iSCSIAlias
Assigns a human-readable name to the iPBridge. Aliases may be 1 to 64 characters in length and may contain spaces if enclosed in quotes.

Default: " "
set iSCSIAlias [Alias]
get iSCSIAlias

iSCSIChap
*Regulates whether CHAP (Challenge-Handshake Authentication Protocol) is to be used for the iSCSI protocol. If CHAP is enabled, the target requires the initiator to negotiate CHAP authentication using the CHAP secrets. An initiator may reject this negotiation. If **discovery** is specified, the setting applies to CHAP during discovery sessions.*

Default: disabled
set iSCSICHAP [default | Target Name | discovery]
[enabled | disabled]
get iSCSICHAP [default | Target Name | discovery]

iSCSIChapSecret

Specifies the incoming and outgoing passwords for iSCSI CHAP sessions. Secrets are case sensitive, 12 to 32 characters, and cannot contain spaces. ***In*** *and* ***out*** *secrets must be different for each name. If* ***discovery*** *is specified, the setting applies to CHAP during discovery sessions. An* ***in*** *secret authenticates the server to the iPBridge. The iPBridge can store up to 32* ***in*** *secrets, each with a unique Account Name and secret pair. An* ***out*** *secret authenticates the iPBridge to the server. There is only one* ***out*** *secret per target which cannot be deleted. The* ***account name*** *for the out secret is* ***root*** *by default.*

set iSCSICHAPSecret [default | target name | discovery] [in [Account Name | all] | out [root] | delete [Account Name | all]] <Secret>
get iSCSICHAPSecret [default | target name | discovery] [in [Account Name | all] | out [root]]

iSCSIInitiators

Displays a list of previous and current successfully logged-in iSCSI initiators, including successful initiators recorded in the event log and any initiators manually added since the last reboot. This list is cleared if the event log is cleared.

iSCSIInitiators

iSCSIMPIO

The iSCSIMPIO setting helps initiators configured for Multi-Path I/O to recognize when a back-end link has been broken. Enable this setting if using a Multi-Path iSCSI initiator. Disable this setting when Multi-Path I/O is not used, to avoid undesirable target behavior.

set iSCSIMPIO [enabled | disabled}
get iSCSIMPIO

iSCSIPortNumber

Specifies the port number which listens for iSCSI connections. Port number must be between 1024 and 65535 with the exception of port 860.

Default: 3260
set iSCSIPortNumber [DPn | all] [portnumber]
get iSCSIPortNumber [DPn | all]

iSCSITarget

Creates/deletes an iSCSI target. The target name acts as a suffix to the standard iPBridge iSCSI-qualified name. The target name may not exceed 24 characters. A newly-created target has one LUN, the iPBridge LUN, at LUN 0. AccessControl is enabled by default, unless iSNSLoginControl is already enabled. If the target name already exists, this command does nothing. The default target cannot be deleted.

iSCSITarget [Target Name] <delete>

iSCSITargetNameDisplay

Displays the iSCSI target name.

iSCSITargetNameDisplay

iSCSIVideoStreaming (OEM Configurable, Disabled on Error)

This command is used to set the iSCSI video streaming mode. Enable video streaming mode if RX FIFO overflows are being reported in the event log. Enabling this mode may signficiantly degrade write performance.

set iSCSIVideoStreaming [enabled | disabled]
get iSCSIVideoStreaming

iSCSIWANIPAddress

Sets or displays the IP address reported to an iSCSI initiator located outside the iPBridge LAN. If this iPBridge is behind a NAT router, the address must be set to the external IP address of the router. Setting the address to ***0.0.0.0*** *causes the iPBridge to be inaccessible from outside the LAN.*

Default: 0.0.0.0
set iSCSIWANIPAddress [DPn | all] [xxx.xxx.xxx.xxx]
get iSCSIWANIPAddress [DPn | all]

iSNSLoginControl

Specifies whether the iPBridge delegates its access control/authorization policy to an iSNS server.

Note

iSNSLoginControl cannot be used with AccessControl .

Default: disabled
set iSNSLoginControl [enabled | disabled]
get iSNSLoginControl

iSNSServer
*Specifies the IP address of a valid iSNS server from which the iPBridge tries iSCSI initiator discovery. Set to **0.0.0.0** to disable iSNS server lookup.*

Default: 0.0.0.0
set iSNSServer [xxx.xxx.xxx.xxx] <[DPn] [VLAN ID]>
get iSNSServer

IsReserved
Displays the reservation status of the current iPBridge.

IsReserved

MaxOpTemp
Regulates the maximum operating temperature of this unit in degrees Celsius. Valid entries are between 55 and 70 degrees.

Default: 70
set MaxOpTemp [55 – 70]
SaveConfiguration Restart command required
get MaxOpTemp

MinOpTemp
Regulates the minimum operating temperature of this unit in degrees Celsius. Valid entries are between 0 and 15 degrees.

Default: 0
set MinOpTemp [0 – 15]
SaveConfiguration Restart command required
get MinOpTemp

OpTempWarn
Regulates the number of degrees Celsius before a thermal control event precipitates a warning to the user. Valid entries are between 0 and 15 degrees.

Default: 5
set OpTempWarn [0 – 15]
SaveConfiguration Restart command required
get OpTempWarn

Password
Specifies the password used for all sessions: NDMP, Telnet, FTP and ExpressNAV. Password is case sensitive, 0 to 32 characters, and cannot contain spaces. An empty password can be configured by pressing the enter key when prompted for the new password and new password confirmation.

Default: Password
set Password

Ping
Sends an ICMP echo request to the specified host.If VLAN is enabled, the VLAN ID must be provided.

ping [DPn | MPn |all] [xxx.xxx.xxx.xxx]<VLAN ID><count <size>>

ReadOnlyPassword
Specifies a password which allows only read and no writes. It is case sensitive, 0 to 32 characters, and cannot contain spaces. An empty password can be configured by not specifying one.

Default: Password
set ReadOnlyPassword

ReadOnlyUsername
Specifies the user name which allows only read and no writes. It is case insensitive, 1 to 32 characters, and cannot contain spaces.

Default: user
set ReadOnlyUsername [username]
get ReadOnlyUsername

Reserve
Reports the state of CLI reservation for the current CLI session. If the command reports that Reservations are enabled, then another CLI session has control of parameter modification on the unit.

Reserve

ResetFCPortErrors
Changes all Fibre Channel error counts for the specified port to zero. Refer to FCPortErrors .

ResetFCPortErrors [fp | all]

RestoreConfiguration
*Issued with the **default** option, forces the iPBridge NVRAM settings to their original defaults. The **saved** option undoes any changes made to this session since the last save.*

RestoreConfiguration [Default | Saved]

RMON

Displays Ethernet data and allows data collection at specified intervals. Get displays hex.

Valid range for bucketsRequest= 1-180
Valid range for ethernetStat index = 1-3
Valid range for historyControl = 1-6
Valid range for ethernetHistory index = 1-6
Valid range for sampleIdx = 1-2147483647
Valid range for interval = 1-3600

Default: See Exhibit A-2 on xiii
set rmon [idx] [bucketsRequest] [interval] [valid | invalid]
get rmon [ethernetStat | historyControl] <idx>
get rmon [ethernetHistory] <idx sampleIdx>

Route

*Assigns an iSCSI protocol address to a target destination device. If you try to map a new FC device to the same iSCSI LUN, the new BTL overwrites the previous map. Using the **Delete** identifier instead of **FC** removes the map from its map table. In verbose mode, overwriting a map requires secondary confirmation.*

Route iSCSI [default | Target Name] [lun] [FC [fp] [fcidx] | Bridge | Delete]

RouteDisplay

Displays a combined list of iSCSI to FC port mappings. The optional target name limits the list to maps which have that target name. The optional LUN parameter limits the list further to the map which satisfies a search for the given LUN.

RouteDisplay iSCSI <default <lun> | Target Name <lun>>

SaveConfiguration

*Issued with the **restart** option, cycles iPBridge power after saving configuration changes. The **norestart** option saves changes without restarting.*

Note

Certain modifications require a system restart.

SaveConfiguration <Restart | NoRestart>

SerialNumber

Displays the serial number of the iPBridge. The serial number is a 13 character field. The first seven alphanumeric characters are an abbreviation representing the product name. The remaining six digits are the individual iPBridge number.

get SerialNumber

SerialPortBaudRate

Configures the baud rate for the iPBridge RS-232 serial port. The number of data bits per character is fixed at 8 with no parity.

Default: 115200
set SerialPortBaudRate [9600 | 19200 | 38400 | 57600 | 115200]
SaveConfiguration Restart command required
get SerialPortBaudRate

SerialPortEcho

Controls if the iPBridge echoes characters on its RS-232 port. When enabled, all non-control character keyboard input is output to the display.

Default: enabled
set SerialPortEcho [enabled | disabled]
get SerialPortEcho

SNMP

Controls whether or not SNMP functions on the iPBridge.

Default: enabled
set SNMP [enabled | disabled]
get SNMP

SNMPDumpMIB

Displays the contents of the ATTO iPBridge private SNMP MIB to the current CLI session. For further assistance with SNMP, consult your network administrator.

SNMPDumpMIB

SNMPExtendedTraps

Regulates Extended (i.e., Device Transition and Device Error) SNMP trap functionality.

Default: disabled
set SNMPExtendedTraps [enabled | disabled]
get SNMPExtendedTraps

SNMPTrapAddress

*Regulates or displays IP Trap Addresses and Trap Levels. **Index** is a value from 1 to 6. The IP address must be in the same subnet as the iPBridge, and is the host that wishes to receive traps. The supported severity levels required to trigger a trap are: **None, All, Warning, Critical***

Default:
iP address =0.0.0.0
Level=none
set SNMPTrapAddress [index] [xxx.xxx.xxx.xxx] [None | All | Warning |Critical]
get SNMPTrapAddress [index]

SNMPTraps
Regulates SNMP traps.If VLAN is enabled on a data port, a VLAN ID for that port must be specified. All SNMP traps are sent with the same VLAN tag.

Default: disabled
set SNMPTraps [enabled |disabled] <[DPn] [VLAN ID]>
get SNMPTraps

SNTP
Controls whether SNTP time server is used.If VLAN is enabled on a data port, a VLAN ID for that port must be specified.

Default: enabled
set SNTP [enabled | disabled] <[DPn] [VLAN ID]>
SaveConfiguration Restart command required
get SNTP

SNTPServer
Controls or displays the main IP address the client uses to retrieve the SNTP time.

Default: 192.43.244.18
set SNTPServer[xxx.xxx.xxx.xxx]
SaveConfiguration Restart command required
get SNTPServer

SpeedWrite
*Improves the performance of WRITE commands to target devices attached to the iPBridge. Specify **all** to set the Speed Write state for each currently mapped device on the iPBridge, or to get a list of the Speed Write states of all currently mapped devices on the iPBridge.*

Default: disabled
set SpeedWrite FC [fp fcindex | all] [enabled | disabled]
get SpeedWrite FC [fp fcindex | all]

SpeedWriteDefault
Specifies the default SpeedWrite state applied to new device mappings created manually or using an AutoMap operation.

Default: disabled
set SpeedWriteDefault [enabled | disabled]
get SpeedWriteDefault

TailEventLog
*Displays new events to the terminal. Type **quit** then press **ENTER** to exit tail mode.*

TailEventLog

Temperature
Displays the current internal operating temperature of this unit in degrees Celsius.

get Temperature

Time
Controls or displays the current time as clocked by the iPBridge in 24 hour format. Time cannot be set while SNTP is enabled.

set Time [HH: MM: SS]
get Time

TimeZone
Controls or displays the time zone or an offset from GMT.

Default: EST
set TimeZone [EST | CST | MST | PST] | [+| -] [HH]:[MM]
SaveConfiguration command required
get TimeZone

TraceLog
When enabled, the unit records various system events to the trace log.

Default: disabled
set TraceLog [enabled | disabled]
get TraceLog

TraceLogFilter
Filters data from specific unit ports when trace logging is enabled.

Default: all all all
set TraceLogFilter [FC | all] [fp | all] [none | chkcond | all]
get TraceLogFilter [FC | all] [fp | all]

Username
Specifies the user name for all sessions. It is case insensitive, 1 to 32 characters, and cannot contain spaces.

Default: root
set Username [username]
SaveConfiguration command required
get Username

VerboseMode
Controls the level of detail in CLI Help output and command response output for the current CLI session.

Default: enabled
set VerboseMode [enabled | disabled]
get VerboseMode

VirtualDriveResponse

Provides proxy responses to INQUIRY and TEST UNIT READY commands if a device selection times out or has a busy event. Host systems can assign devices consistently regardless of the device's state during the execution of the commands.

Default: disabled
set VirtualDriveResponse [enabled | disabled]
get VirtualDriveResponse

VLAN

Sets Virtual LAN ID values for each Ethernet data port. Up to 8 IDs can be stored per port. Incoming packets are filtered if their tags are not on the list of VLAN IDs for that data port. Outgoing packets are tagged to match their connection. Each VLAN ID is assigned a VLAN name of up to 64 characters. If no VLAN IDs exist for a data port, VLAN is disabled for that data port.

set VLAN [DPn | all] [[VLAN ID] [VLAN Name] <delete> | [all] [delete]]
get VLAN [DPn | all]

Voltage

Displays the current voltage levels monitored by the unit.

get Voltage [VDDA | VDDB | VDDC | VDDD | all]

WrapEventLog

Controls EventLog output wrapping. When enabled, the unit logs up to 2048 event entries before overwriting the first entries. When disabled, the unit stops logging event entries at buffer full.

Default: enabled
set WrapEventLog [enabled | disabled]
SaveConfiguration command required
get WrapEventLog

WrapTraceLog

Controls Username output wrapping. When enabled, the unit logs up to 2048 trace entries before overwriting the first entries. When disabled, the unit stops logging trace entries at buffer full.

Default: enabled
set WrapTraceLog [enabled | disabled]
get WrapTraceLog

Exhibit A-2 Default history Control table (buckets and interval in hexadecimal) for the RMON CLI command.

```
Idx DataSrc              BktReq   BktGrant Interval Owner   Status
=================================================================
001 43.6.1.2.1.2.2.1.1.1 00000032 00000032 0000001e monitor 00000004
002 43.6.1.2.1.2.2.1.1.1 00000032 00000032 00000708 monitor 00000004
003 43.6.1.2.1.2.2.1.1.2 00000032 00000032 0000001e monitor 00000004
004 43.6.1.2.1.2.2.1.1.2 00000032 00000032 00000708 monitor 00000004
005 43.6.1.2.1.2.2.1.1.3 00000032 00000032 0000001e monitor 00000004
006 43.6.1.2.1.2.2.1.1.3 00000032 00000032 00000708 monitor 00000004
```

Appendix B Safety standards and compliances

The equipment described in this manual generates and uses radio frequency energy. If this equipment is not used in strict accordance with the manufacturer's instruction, it can and may cause interference with radio and television reception. Refer to the Technical Specification sheet available at www.attotech.com for a full list of certifications.

WARNING

Risk of explosion if battery is removed and/or replaced by an incorrect type. Dispose of used batteries in accordance with your local environmental regulations.

No operator serviceable components inside the iPBridge.

Do not remove cover of iPBridge. Refer servicing to qualified personnel.

FCC Standards: Radio and Television Interference

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide a reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, try to correct the interference by one or more of the following measures

- Move the receiving antenna.
- Relocate the bridge with respect to the receiver, or move the bridge away from the receiver.
- Plug the computer into a different outlet so the computer and receiver are on different branch circuits.
- If necessary, consult an ATTO authorized dealer, ATTO Technical Support Staff, or an experienced radio/television technician for additional suggestions.
- The booklet *How to Identify and Resolve Radio/TV Interference Problems* prepared by the Federal Communications Commission is a helpful guide. It is available from the US Government printing office, Washington, DC 20402, Stock No. 004-000-00345-4.

Canadian Standards

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Standards

Declaration of Conformity

This following statement applies to the ATTO iPBridge.

This device has been tested in the basic operating configuration and found to be compliant with the following European Union standards

Application of Council Directive: 89/336/EEC

Standard(s) to which conformity is declared: EN55022, EN5024, CE60950

This Declaration will only be valid when this product is used in conjunction with other CE approved devices and when the entire system is tested to the applicable CE standards and found to be compliant.

The ATTO iPBridge 2700 complies with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Appendix C Warranty information

Manufacturer limited warranty

Manufacturer warrants to the original purchaser of this product that it will be free from defects in material and workmanship as described in the ATTO Technology website, www.attotech.com. Manufacturer liability shall be limited to replacing or repairing, at its option, any defective product. There will be no charge for parts or labor should Manufacturer determine that this product is defective.

Products which have been subject to abuse, misuse, alteration, neglected, or have been serviced, repaired or installed by unauthorized personnel shall not be covered under this warranty provision. Damage resulting from incorrect connection or an inappropriate application of this product shall not be the responsibility of Manufacturer. Manufacturer's liability is limited to Manufacturer's product(s); damage to other equipment connected to Manufacturer's product(s) will be the customer's responsibility.

This warranty is made in lieu of any other warranty, express or implied. Manufacturer disclaims any implied warranties of merchantability or fitness for a particular purpose. Manufacturer's responsibility to repair or replace a defective product is the sole and exclusive remedy provided to the customer for breech of this warranty. Manufacturer will not be liable for any indirect, special, incidental, or consequential damages irrespective of whether Manufacturer has advance notice of the possibility of such damages. No Manufacturer dealer, agent or employee is authorized to make any modification.